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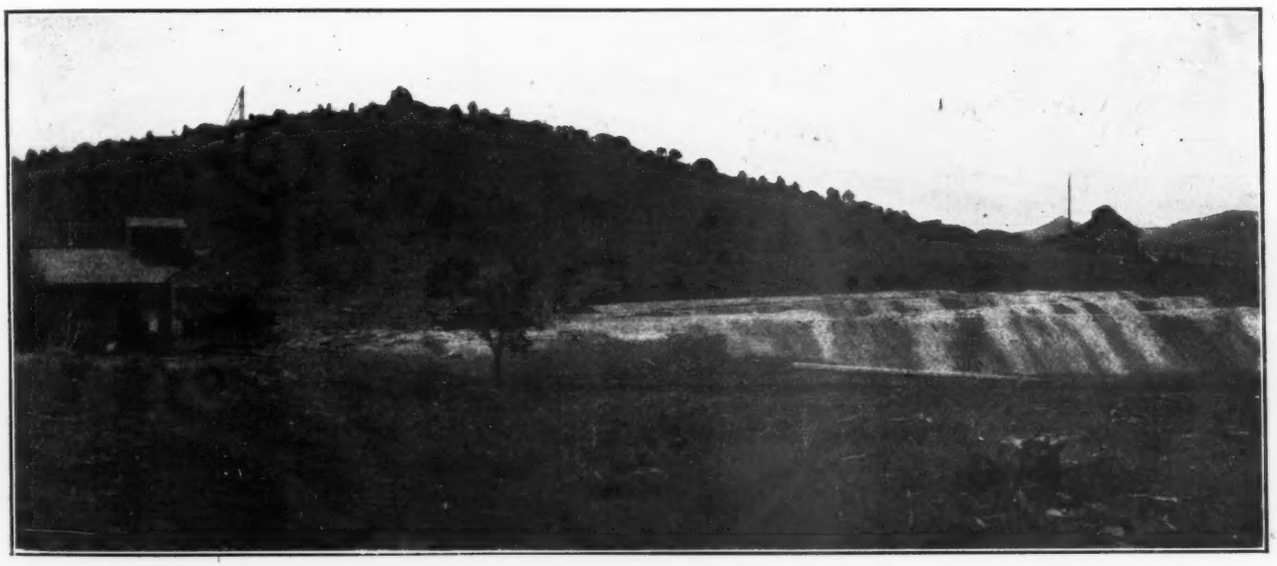
The Productive and Earning Capacity of Ely

A Large Part of the Copper of This District Will Be Produced for 7c. Per Pound. Ore Reserves Assure Production for Many Years

BY WALTER RENTON INGALLS

When large interests in the Nevada Consolidated Copper Company were purchased in New York and Boston, about two years ago, and the company was suitably provided with funds for the equipment of its mines, the construction of the Nevada Northern railway and the erection of concentrating mill and smeltery, there was no idea that these enterprises would be carried out otherwise than as an independent undertaking. Mr. Channing reported that there was between 5,000,000 and 6,000,000 tons of ore developed in the two mines of the company, and advised extraction and reduction of the ore at the rate of 2000 tons per day, on which basis the ore developed would constitute a supply for eight years, but he added that the conditions of the district all pointed to the probability of the extension of the orebodies then opened and the finding of new ones, wherefore he expressed the opinion that a daily production of 2000 tons might be safely counted upon for a great many years to come, with a strong probability that the production might be increased to 2500 or 3000 tons per day without materially affecting the ore reserves.



EUREKA MINE, ELY, NEV.

The orebody of this mine lies largely under the hill shown in this photograph. Operations with the steam shovel will begin at the foot of the hill. The old shaft of the New York & Nevada Copper Company is shown at the left, and the later shaft of the Nevada Consolidated at the right.

THE GUGGENHEIM PURCHASE.

Early in the Ely boom the Guggenheims acquired the controlling interest in the Cumberland-Ely Copper Company, which had some property of good prospective value in the district, together with some valuable water rights in the Steptoe valley. Having thus become engaged in the district, they began quietly in 1906 to buy stock in the Nevada Consolidated and by the middle of the year secured control of the latter company through the ownership of 51 per cent. of its stock, for large blocks of which it is understood that $12.50 per share was paid. Since then the Nevada Consolidated has been a Guggenheim company, the old management having retired and all subsequent operations being conducted by Guggenheim engineers.

It appears that the Cumberland-Ely Copper Company profited more from this transaction than did the Nevada Consolidated. The latter was already far along with the construction of the railway and was going to have its own smelting works, which in the natural course of events would probably develop an important custom business. The company also owned the Georgetown ranch, about 2800 acres, north of Ely, which carried with it the right to the water of Murry creek—a continuous flow of 4,000,000 gal. per 24 hours, which Mr. Channing considered one of the most valuable assets of the company, inasmuch as it assured a supply of water capable of treating many times the amount of ore which the mines could produce. The Cumberland-Ely Copper Company at this time had no mining development of great consequence, but owned valuable water rights on the other side of Steptoe valley.

However, under the new management, the Nevada Consolidated relinquished its great advantages to the Cumberland-Ely company, the two companies becoming equal partners in what the Nevada Consolidated might have had alone. The Cumberland-Ely company was allowed to buy a half interest in the Nevada Northern railway, and the Steptoe Valley Smelting and Mining Company was organized to build the mill and smelting works, the Nevada Consolidated and Cumberland-Ely each owning a half of this company. On the other hand the Cumberland-Ely Company transferred its water rights to the Steptoe company. The location of the

works was finally made at a place where the latter could be utilized, instead of just north of Ely as originally contemplated. Of course this deal was not entirely disadvantageous to the Nevada Consolidated. It was provided with smelting capacity considerably greater than it had contemplated, at least to begin with, but certainly it lost the controlling position in the Ely district which it would doubtless have retained if the Guggenheims had not acquired 51 per cent. of its stock.

Ore Reserves

In my previous article on the Ely mines I called attention to Mr. Channing's estimate of 2,400,000 tons of ore averaging 2.6 per cent. copper developed in the Ruth mine, my own estimate being roughly 2,320,000 tons; and 3,200,000 tons averaging 2.2 per cent. in the Eureka mine, my estimate being 4,300,000 tons. The mines stand today substantially as they were at the time of Mr. Channing's examination two years ago. The amount of ore developed is so large that it has not been worth while to block out any more. At the Ruth mine no additional exploration work has been done; at the Eureka a few of the drifts have been extended a little and several drill holes have been put down, squaring up the developments and adding somewhat to the known reserves. But there is no basis for some reports as to immense additions to the ore blocked out in these mines that have been published at several times.

However, there is no doubt that the development of 5,600,000 tons estimated by Mr. Channing, or the 6,700,000 tons which may be now accepted, represents only a moderate part of the ore that these mines will yield.

The Ruth Mine.

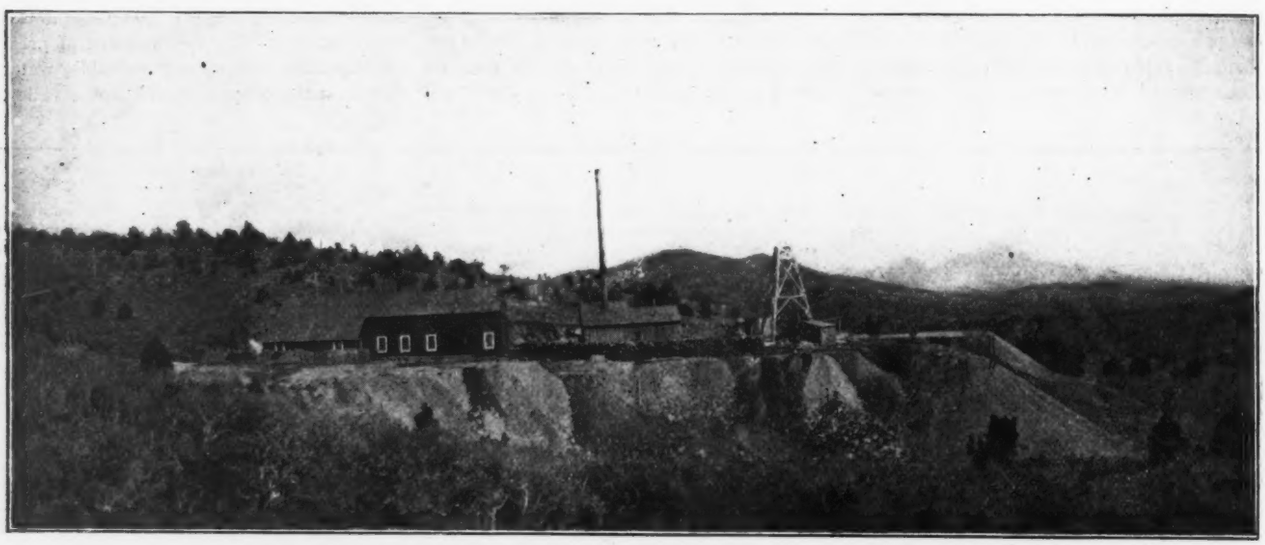
Mr. Channing's estimates were extremely conservative, as he stated in his report, and were so simply because of the absence of developments in certain directions, particularly in the Eureka mine. Anyone who has subsequently inspected the two mines will agree with this. In the Ruth mine developments have been made through a section of 420 ft. vertically, and down to a depth of 307 ft. there are three levels open to examination. The fourth level is under water, but is said to show low-grade ore and the limit of the zone of pay ore is probably somewhere between it and the third level, a vertical distance of 111 ft. Mr. Channing estimated pay-ore for only 30 ft. below the third level, which is conservative but nevertheless there is apparently no great room for enlargement of this orebody with depth; additions to the Ruth reserves are of "prospective" character rather than "probable," and depend chiefly upon horizontal extension of the orebody to the north and northwest beyond the limits of any explorations that have been made up to date. The estimates of the Ruth orebody as at present developed do not consequently appear so ultra-conservative as do those of the Eureka.

The Eureka Mine

In the latter case the developments have been made chiefly on a single horizontal plane. A series of well distributed raises shows that the ore extends to a hight of 70 ft. above this plane. As to the extension below it Mr. Channing assumed only 30 ft. and I have followed him, but we have the evidence that in the Ruth mine the zone of secondary enrichment is actually proved to be 212 ft. thick, and in the Eureka mine the small development on the level 220 ft. below the main level shows that it is probably below the zone of pay ore although the occurrence of occasional rich patches indicates that perhaps it is not very far below it. Mr. Channing said "It seems probable that ore of the above grade (2.2 per cent. copper) will be found for another 100 ft. vertically at the Eureka shaft, which would add an equal tonnage."

It is not over-optimistic to assume that the Ruth mine has a present development of 2,400,000 tons of positive ore, with probable ore to an amount of 10 to 12 per cent. of that, while the Eureka mine has a present development of 4,300,000 tons of positive ore, with probable ore to a nearly equal amount, and that the two mines have positive and probable ore to the amount of 10 or 11 million tons, or about 10 years reserve at the rate of mining that is now being planned, with promising prospective areas in each case.

The orebody of the Veteran mine of the Cumberland-Ely company has not yet been sufficiently developed to enable any safe estimate of its size to be made, but the indications are that it will prove to be one of several million tons. There is but little information available as to the magnitude of the Giroux orebodies.



THE ALPHA SHAFT, GIROUX CONSOLIDATED MINES COMPANY

Mining and Milling

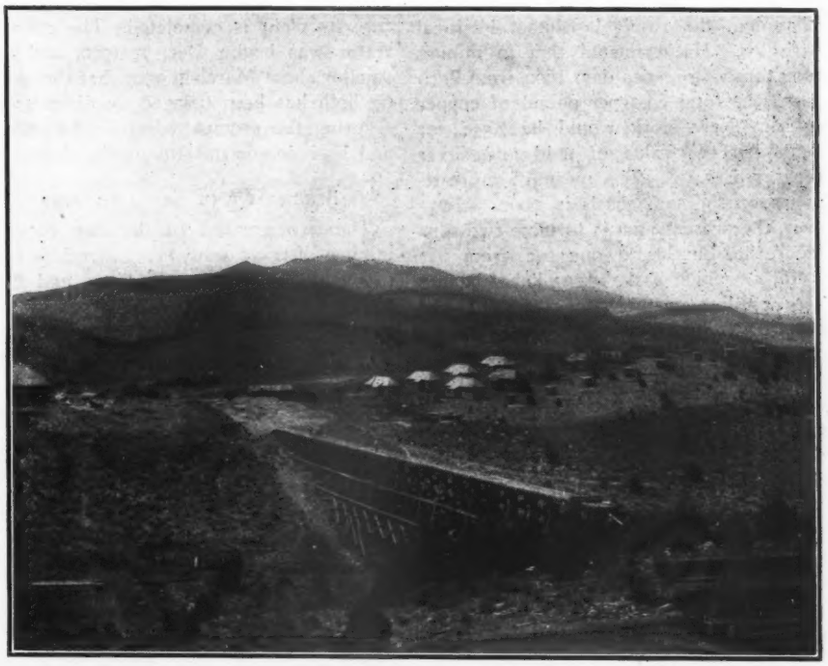
According to the present plan, the Cumberland-Ely company will produce 1000 tons of ore per day and the Nevada Consolidated 3000 tons, the latter securing 2000 tons from the Eureka mine and 1000 tons from the Ruth. As pointed out in my previous article, the Ruth mine will be worked by the caving system, and the Eureka by the open-cut, steam-shovel method. The Veteran mine also will probably be worked by the caving system.

The cost of mining by the caving system, including exploration and dead-work, ought not to be more than 90c. per ton. The steam-shovel mining at the Eureka ought to be done for 45c. per ton. From the mines to the mill and smelter at McGill the distance by railway is about 20 miles. Estimating that the ore will be carried that distance for 0.5c. per ton mile,

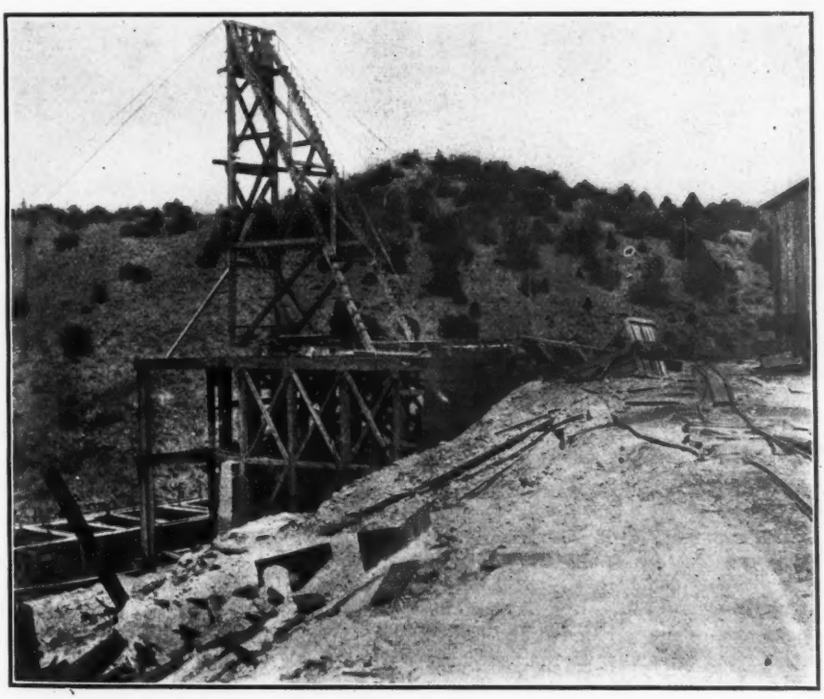
or about the same rate as from Butte to Anaconda, the carriage will be 10c. per ton. The milling should be done for not to exceed 40c. It will cost a little more than at Garfield, because coal and labor are more expensive and more care will be taken in sampling the ore, which will come from two different companies. The extraction in the mill will be upward of 75 per cent. The results obtained from the experimental mill at the Ruth mine indicated to Mr. Channing that an extraction of 77 per cent. could be secured from the Ruth ore and 79 per cent. from the Eureka ore, which figures he adopted in his estimate. The ore of these mines is more friable than that of Bingham, and the mineral is not so finely disseminated; consequently the crushing is easier and need not be so fine. The Ruth ore contains about 3 per cent. of chalcocite and 10 per cent. of chalcopyrite and pyrite and will concentrate about 7:1, yielding a concentrate with 13.3 per cent. copper. The Eureka ore, being somewhat lower in pyrites, will concentrate 10:1, yielding a product with 17.5 per cent. copper. The Veteran ore is decidedly heavier in mineral and in its case it is expected that the ratio of contraction will be only 3:1 or 3.5:1.

Smelting

From the milling of 2000 tons of Eureka ore, and 1000 tons each of Ruth and Veteran there will be obtained therefore, 200, 143 and 300 tons of concentrate respectively, or 643 tons of ore per day to be smelted. In addition to this the smelter will undoubtedly obtain considerable ore from other mines. The capacity of the smelting works will be liberal and from the beginning it will afford a market for all that the present developments of the Fly district will offer. The smelting process will consist of roasting in McDougall furnaces, smelting in reverberatories and converting. As compared with the conditions at Salt Lake, the greatest difference will be in the cost of the coal, which at McGill will probably be something like $8 per ton, the coal coming from Rock Springs, Wyoming. As compared with the cost of smelting under ordinary conditions, moreover, the cost in this case will be increased by the high grade of the concentrate, i.e., the large proportion of matte to be converted. The cost of producing blister copper from a ton of Ruth concentrate may be estimated at $5; from a ton of Eureka concentrate at $5.50. On these bases we may estimate a charge for smelting of $6 and $6.50 respectively, and an extraction of 95 per cent. of the copper.



STAR POINTER VILLAGE, JULY 25, 1907



STAR POINTER SHAFT, NEVADA CONSOLIDATED

This view shows the gallows frame with which sinking was done. A large, modern hoisting plant is now being erected.

Cost of Production

Consequently, one ton of Ruth ore, containing 2.6 per cent., or 52 lb. of copper, will yield $52 \times 0.77 \times 0.95 = 36.23$ lb. of refined copper; and one ton of Eureka ore, containing 2.2 per cent. or 44 lb. of copper, will yield $44 \times 0.79 \times 0.95 = 33.02$ lb. of refined copper. The cost of production in each case will be as follows:

RUTH.

Mining 1 ton	$0.900
Transportation to mill	0.100
Concentrating	0.400
Smelting 1/7 ton @ $6	0.857
Freight on 36.6 lb. of pig @ 0.65c.	0.238
Refining 36.6 lb. of pig @ .85c.	0.311
Administration and general expense	0.200
Total	$3.006

EUREKA.

Mining 1 ton	$0.450
Transportation to mill	0.100
Concentrating	0.400
Smelting 0.1 ton	0.650
Freight on 32.4 lb. of pig @ 0.65c.	0.211
Refining 32.4 lb. of pig @ 0.85c.	0.275
Administration and general expense	0.200
Total	$2.286

The ore of both mines averages about 0.02 oz. gold and 0.04 oz. silver per ton, representing a value of about 43c. per ton. A recovery of 20c. per ton is a moderate estimate. Reckoning that as a by-product and deducting it from the

totals of the mining and other costs, it will be seen that the Ruth ore will yield 36.23 lb. of copper at a cost of $2.806, or 7.75c. per lb.; while the Eureka ore will yield 33.02 lb. at a cost of $2.086, or 6.3c. per lb. Although the details of my estimates differ somewhat from those of Mr. Channing, the result is almost identical with his. He estimated that in mining 2000 tons of ore per day, 1000 from each mine, the total cost per pound of copper sold in New York would be 7.53c., or deducting the value of gold and silver recovered, 7.03c. The mean of my estimates on the same basis is 7.06c. However, the present plan is to mine two tons from the Eureka to one ton from the Ruth, on which basis 102.27 lb. of copper (the product of three tons of ore) will cost $6.978, or 6.82c. per lb.

The Cumberland-Ely

It is interesting to summarize the prospects of the Cumberland-Ely company on the same basis as above. Assuming that the ore of the Veteran mine will average 3 per cent. copper and will concentrate 3½:1, yielding a concentrate assaying 7.8 per cent. copper, the product of refined copper from a ton of ore will be 44.46 lb. The cost of production will be as follows:

Mining 1 ton	$0.90
Transportation to mill	0.12
Concentrating	0.40
Smelting 1/3 ton @ $5	1.67
Freight on 44.7 lb. of pig @ 0.65c.	0.29
Refining 44.7 lb. @ 0.85c.	0.38
Administration and general expense	0.25
Total	$4.01

Deducting 20c. for recovery of gold and silver, the cost of 44.46 lb. of refined copper will be $3.81, or 8.57c. per lb. Of course this estimate is largely speculative, inasmuch as the data for this mine have not yet been determined with the same precision that they have for those of the Nevada Consolidated, but it is obvious that in spite of the higher grade of the Veteran ore, the copper from it will be more costly than that from the Nevada Consolidated, because of the higher cost of mining and the larger amount of concentrate to be smelted, although the iron of the latter will be valuable flux for the smelting of outside, siliceous ores.

Productive Capacity

The annual productive capacity of the four developed mines of Ely on the basis of the plans that are now being consummated is as follows:

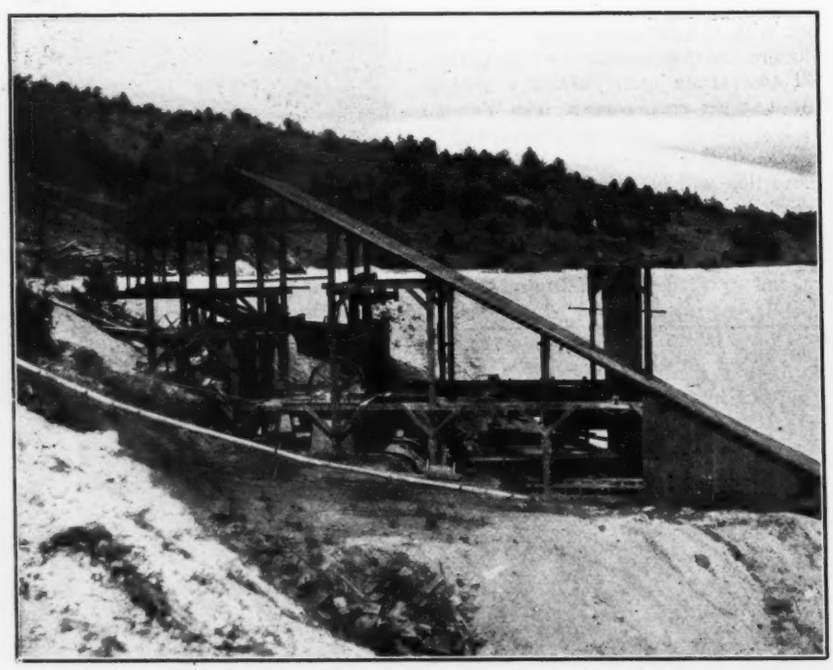
	lbs.
Ruth mine	13,042,800
Eureka mine	23,774,400
Total Nevada Consolidated	39,817,200
Cumberland-Ely	16,005,600
Giroux	8,000,000
Grand total	63,822,800

The above estimate is based upon the assumption that the Cumberland-Ely and Giroux ores will average 3 per cent. copper in each case. The Giroux company will be the first large producer, its mill being expected to be in full running order about Oct. 1, but my estimate of its productive capacity is conditional, of course, upon adequacy of water supply. The Nevada Consolidated may begin milling on a small scale by the end of 1907, but it will probably be nearly the middle of 1908 before its plant is completed. The concentrator was begun Dec. 7, 1906, and the smelter about March 1, 1907, but the work on both has been delayed by difficulty in securing the prompt delivery of material and by indecision as to certain plans.

Bingham and Ely Compared

The two greatest of the new copper-mining districts now being developed in the United States are Bingham and Ely, the combined production of which by the middle of 1908 ought to be at the rate of nearly 150,000,000 lb. per annum. (This, of course, refers only to the porphyry ore of Bingham and excludes the sulphide ore from which production has heretofore been going on.) All of this will be comparatively cheap copper, the probable cost of production to the two companies of Bingham being in the neighborhood of 7c. per lb., while the cost for a large part of the production at Ely will be about the same, for a part a little higher. In many respects the conditions at the two districts are similar. In both cases the ore is chalcocite and chalcopyrite finely disseminated in monzonite; in both cases the orebodies are of immense size; and in both cases the conditions are favorable to cheap mining. Operations in the two districts are being carried on with a magnitude that is almost bewildering. The two mines at Bingham will produce 10,000 tons of ore per day; the four mines at Ely will produce 4500 tons of ore per day. The ore of Ely will assay 2.2 to 3 per cent. copper; that of Bingham will go about 1.8 per cent. The disadvantages of the lower grade of the ore at Bingham, and the finer dissemination of the mineral (which leads to a lower percentage of extraction in milling) are quite offset by the ability to mine more cheaply, a larger proportion of the ore being capable of extraction by steam shovel than at Ely.

In so far as ore reserves are concerned, the tonnage of developed ore at Bingham is far superior to that at Ely, although the orebodies of the latter place are gigantic. In this comparison it is merely a difference between giants, in which Bingham overtops all others, even after allowing for the prospective resources of Ely. The mines of Ely are certainly great, but those of Bingham are greater. It is evident that the two districts will make an immense addition to the world's supply of copper and will have a powerful influence upon the market for the metal.



THE REQUA & BRADLEY EXPERIMENTAL MILL AT THE RUTH MINE

According to the London *Times*, a combination or company under the name Gesellschaft für Elektrostahl-Anlagen, has just been organized at Berlin for producing steel with the electric furnace. The leading concern in it is Siemens & Halske, but it embraces others of importance. The company will utilize the induction furnaces of Kjellin and Röchling-Rodenhauser for making iron and steel and ferro products. Its activity will extend to all countries except Great Britain and its colonies, the United States, Norway and Sweden, in all of which companies already exist for the exploitation of these furnaces.

Tin Mining in Siam

Tin Deposits of the Malay Peninsula Extend into Siam. Methods of Mining and Working. Chinese Control the Tin-mining Districts

BY K. VAN DORT*

In the absence of authentic record it would be idle to surmise at what date the early pioneers of the tin-mining industry in Malaya—the Chinese—first ventured in quest of the white metal which for centuries past they have utilized in the arts and manufactures.

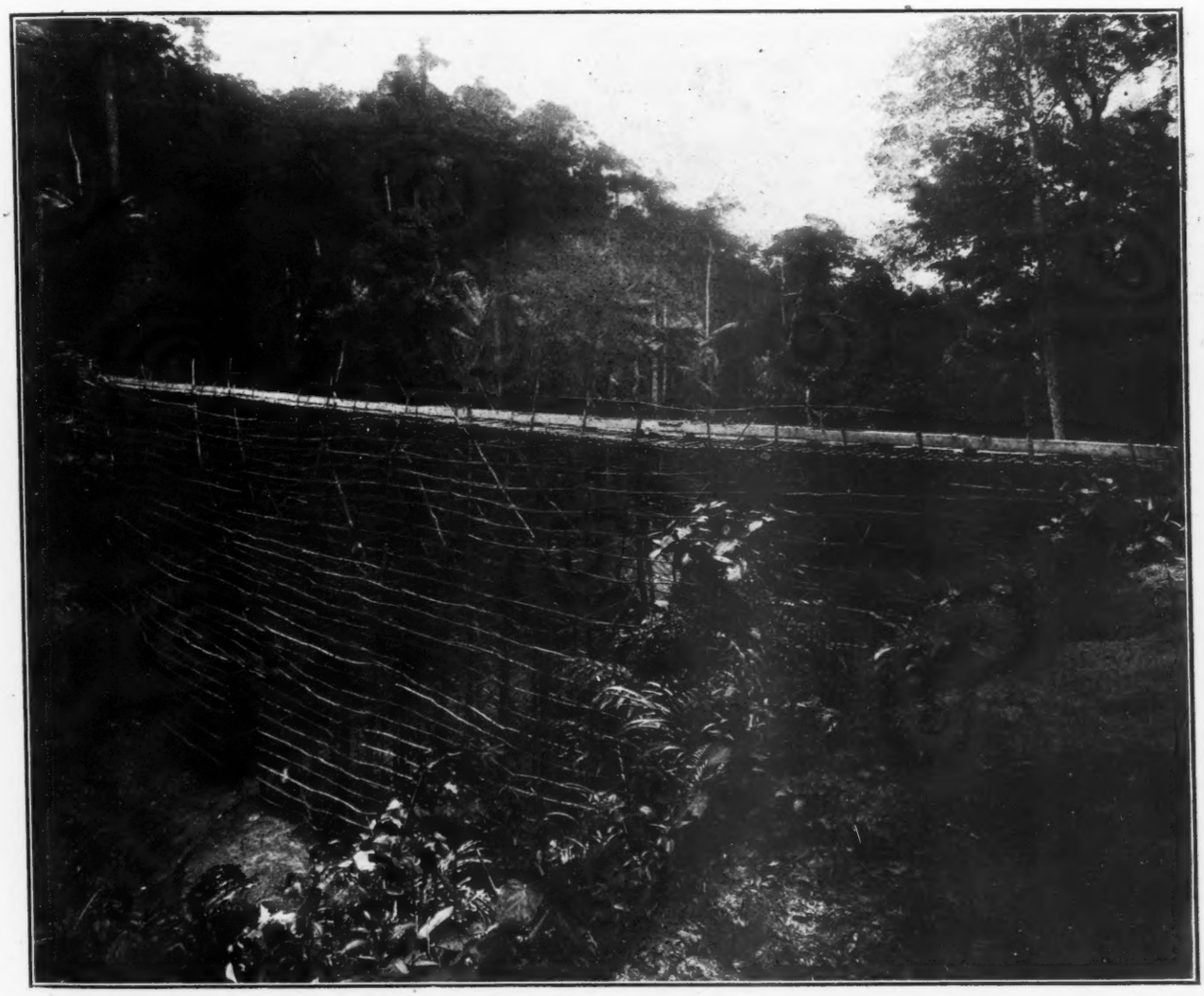
Early Mining

A recent contributor to the *Revue Scientifique* very ingeniously adduces historic fact to support a theory that the Malay Peninsula was the Ophir of Solomon, and attempts to trace the analogy of the word tin from the Malay *Timah*. We read further, that long before the advent of the earliest Portugese discoverers, tin was a commercial commodity not only in the chief Mongolian cities, but, through the agency of the desert caravan was brought into Asia Minor, and distributed throughout the centers of European commerce. However this may be, it is clearly evident that the bronze idols and tin implements which have been unearthed from time to time, relate to a very early period in the world's history—long before the dawn of the Christian era.

In early times, hampered by the vicissitudes of an unsettled and warlike country—the scene of constant invasion by barbarian hordes, and of the ravages of the terrible Malay pirate—very little could have been possible toward the establishment of a regular industry, and it was not until the colonization of Malacca by the Portugese in the early part of the sixteenth century that we find any record of the shipment of ore to European ports.

British Settlement

With the settlement of the British at Singapore, and the consequent acquisition by them of what is now known as the Federated Malay States, an increased stimulus was given to the mining industry by security of life and tenure, and the establishment of equitable mining laws adapted to the conditions and requirements of the country. For many years, owing to the low price of the metal and the limited demand for it prior to the development of



BAMBOO TRESTLE AT TRANG, SIAMESE MALAYA

*Bangkok, Siam.

the great canned-food industry, it was not considered sufficiently remunerative for Europeans to engage in, and the work was entirely in the hands of the Chinese, who confined their attention to the alluvial deposits underlying the valleys formed by spurs of the great mountain range running almost due north and south the whole length of the peninsula. Some of these alluvial mines have proved to be extremely rich; fortunes have been rapidly acquired by men who could neither read nor write, and with no better status than the ordinary Chinese coolie; and, it is undoubtedly a fact, that the present prosperity of the Straits' Chinese with their millionaire Towkays, large banking houses, and shipping combines, is almost entirely due to the wealth accumulated within the last three or four decades from the tin mines of Malaya.

Late years have witnessed an enormous and rapid development both in price and production; and the attention of business men in the east has been greatly attracted by the encouraging results achieved by the pioneers of European enterprise, who in many cases, have been able to convert, with modern mining methods, small Chinese holdings into large dividend paying concerns and to prove beyond doubt that it only requires western skill and capital to develop an industry, which from sheer lack of enterprise had been allowed to stagnate in the hands of the ignorant Chinese coolie.

The Siamese States

In the Siamese States, for very obvious reasons, progress has not been on the same rapid lines as in the British Dependencies further south; and European prospectors have for the most part held aloof from the northern portion of the Peninsula, preferring to operate in the more settled country with better means of communication and protection. But as a result of the enormous activity shown by both the Europeans and Chinese miners all over the Federated States in acquiring mining leases wherever the slightest chance of remuneration offered on a tin bearing area, prospectors have been forced into the remote interior, where the problem of transport across the mountains has to be considered, and now look with covetous eyes to the wide field that Siam promises for future development. There seems little doubt, that in Siamese territory there exists as rich, if not as extensive a mineral area as that contained in the British or Dutch possessions; and nowhere in the European-owned States is there so rich a field within narrow limits as that contained in the little island of Puket, which furnishes the Siamese Government more than half the total revenue derived from this source; and, it is only a question of time, depending on increased facilities for transport, and better means of communication, when territories hitherto unexplored, will prove to be equally productive, and as important mining centers as this much prized, zealously controlled district on the western coast, and will no doubt offer to Siam her most important source of revenue for the future.

There seems to be but a very slight appreciation in mining circles of the potentiality of the Siamese States with regard to the future of the tin-mining industry, and it is only quite recently that active steps have been taken to investigate this source, with results, generally speaking, that have proved equal to the brightest anticipations. Without entering too minutely into statistical detail, let us take a brief survey of a few important facts concerning the industry as it now stands, and glance at the methods employed by the Chinaman, in the production of the metal over which for so many years he has retained an almost exclusive monoply—as far as the Malayan Peninsula is concerned.

Value of Tin

Tin, which in common with the other metals has rapidly risen in price within the last two years, seems destined to be in increased demand in the arts to an extent little accounted for by its most ardent promoters. In October, 1904, it was worth £127 a ton; in October, 1906, £198 a ton; and the price is still rapidly rising. Ten years ago, the price was considered high at £49 a ton, and the Chinese were making big profits then, when facilities for transport were not what they are now. Further, the art of smelting, little understood as it may be even at present, was in past years so rudely conducted, that the overheating of a furnace frequently converted profit into loss. It is true that the absurd conservative prejudices which the Chinese held in the past have to a great extent been overcome, and they are now gradually adopting improved methods, both in the winning and smelting of ore, and that inferior grades of ore, which were formerly not capable of treatment, are now being profitably operated from the skill they have acquired under European guidance; but a mere cursory inspection of the methods employed by the Chinese, would convince any practical observer of the enormous advantages and splendid opportunities which would be offered by substituting modern machinery and scientific skill for the antiquated methods in vogue, which, crude as they are, furnish the operators substantial profits, and the commercial world 90 per cent. of the tin production of Malaya.

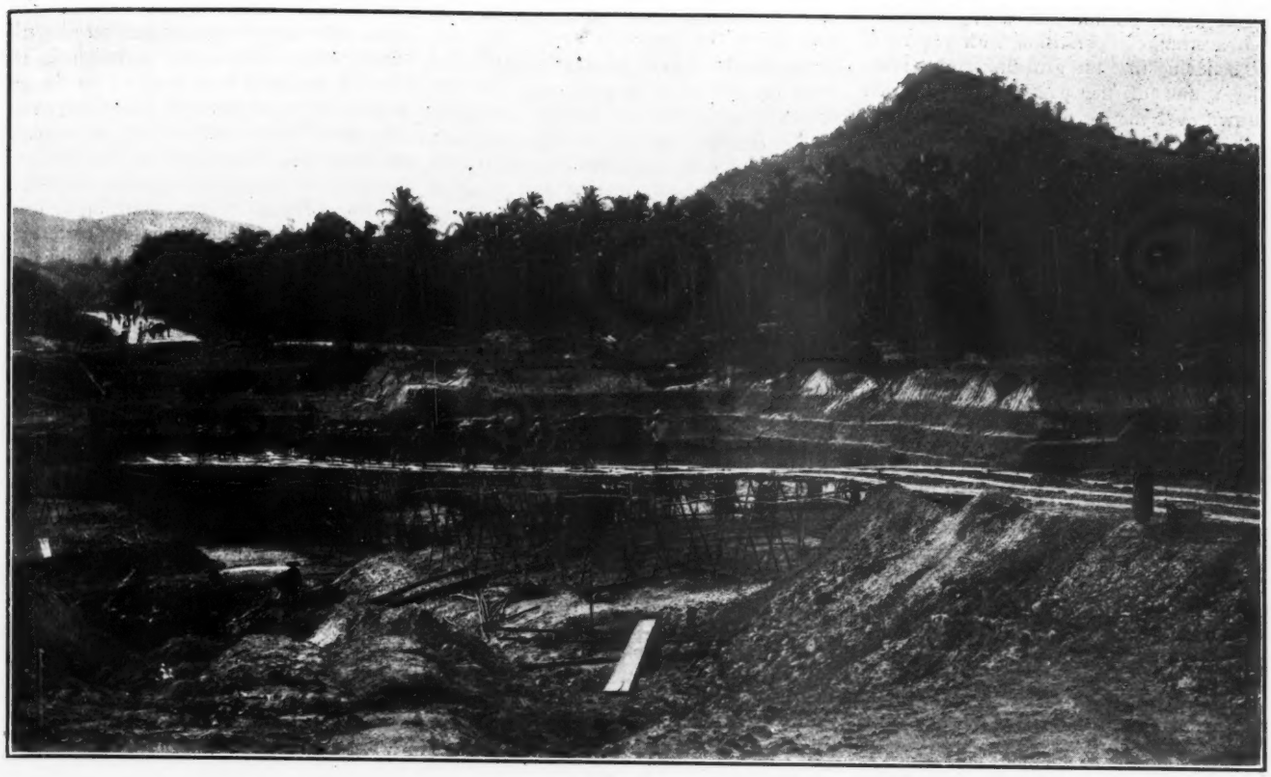
Chinese Mining Methods

The chief difficulty which besets the Chinese miner at the very outset is want of capital, and consequently, in a country like Siam, where mining laws have never been enforced, they resort to methods which are detrimental to mining interests generally. For instance: A great deal of the tin produced in this country comes from districts where small gangs, or *Kongsis* operate independently, without obtaining any regular license or claim, wherever they choose, and in any manner possible, so long as they do not interfere with the agricultural interests of the natives. This leads to very unsatisfactory results, large areas being worked superficially for the contents of the upper strata only, as affording the quickest returns for a limited expense of labor, and then abandoned entirely for fresh ground. In the course of a few years, with the rapid and luxuriant growth of tropical vegetation, it assumes once more the normal appearance of virgin forest, and many prospectors have been misled in this way, little suspecting that 15 or 20 ft. beneath the surface were rich leads which in spite of the heavy over-burden would amply pay reworking. At a mine in Perak, quite recently, the Chinese had worked a large area down to a depth of 30 ft. with considerable profit, when they encountered a stratum of clay which they mistook for bed-rock, and below which no tin-bearing strata is found, when a European miner came along and obtained permission to put down a trial bore hole with a small hand machine. The results showed that rich tin-bearing gravel continued to a depth of 70 ft. below the barren layer of clay. However, it must not be supposed that the native miners are altogether an ignorant lot; wonderful ingenuity have they displayed in many cases, and natural difficulties have been overcome, which, considering their want of education, show great skill and adaptability. The bamboo aqueduct shown in the accompanying illustration may be taken as an elaborate example of their engineering skill. It is not designed to stand the test of time, but it answers its purpose admirably, and it is wonderful with what rapidity they will erect such a structure, finding all their implements and material in the surrounding jungle, and using no other tool but a small chopper of native manufacture.

The Puket Mines

At Puket where operations are carried on on a much more extensive scale than elsewhere, may be seen some of the best examples of mechanical skill in various contrivances for pumping and conveying water. A curious but common form of elevator for raising water from the deep levels at some of the larger mines is in the shape of an endless-chain bucket, which derives its motion from the pinion attached on the main shaft of an overshot water wheel, the buckets or paddles fitting into the teeth of the pinion, and sliding down a long sluice-box which is divided into two compartments, the upper one serving as a guide or carrier for the chain, and the lower forming the delivery pipe for the water.

The Chinese pride themselves very much when they have one of these noisy,

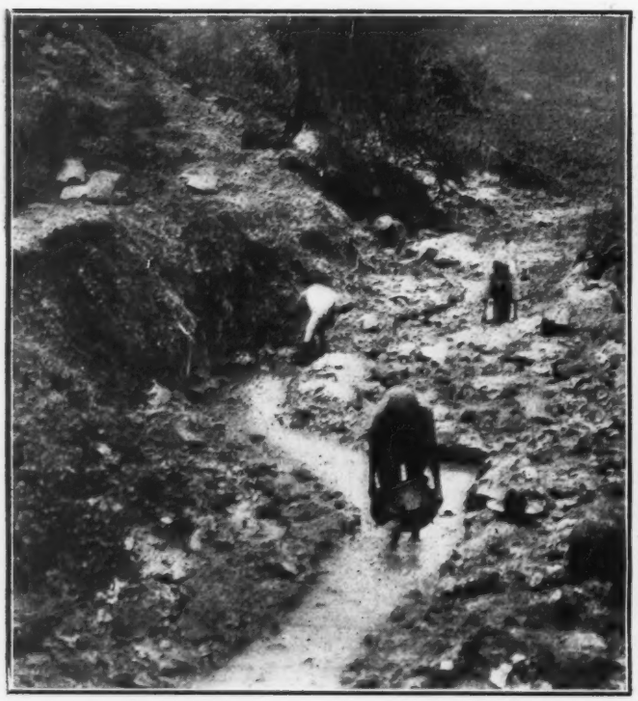


RICH TIN MINE AT PUKET, SIAM

CHINESE COOLIES WORKING IN THE MINES

cumbersome machines at work, and cherish a strange superstition with regard to it, believing that the groaning and squeaking sound of the paddles as they are drawn over the boards emanates from the spirits of the mines, whom of course it is their duty to propitiate; and many curious offerings may be seen scattered around the head of the shaft.

In fact it has often been remarked that the most noteworthy feature in connection with the whole business of mining in the Peninsula is the strange combinations of superstition and idolatory with practical common sense that one sees at every Chinese mine, no matter in what part of the country—whether in the British Dependencies or in Siam. In front of their huts, and around the pit mouth, tiny Joss houses are erected, in which offerings are made, and the Joss sticks kept burning night and day. No stranger is allowed to enter the mines without submitting to their forms and ceremonies, and even Europeans are compelled to remove their shoes before entering into what they consider sacred ground. As a rule the Chinese miner keenly resents the intrusion of an European at the mines and to avoid trouble one has to procure a letter or passport from the mine-owner; but, once having secured their confidence, the foreigner finds the best of treatment at their hands and they will even suspend operations to permit him to make any inspection he may be interested in. It is a very inspiring sight, in a land of lethargy like Siam, to see these men at work at one of the big mines. Though they seldom average more than six hours a day, they show great activity while at work, and resemble a lot of ants, swarming up and down the banks in single file, each with his little load of earth suspended over his shoulder, keeping step over the springy planks, and at a jog-trot the whole time. At the edge of the pit, and close to the sluice-box, so that he may watch both operations of digging and washing at the same time, stands the mine-boss, a big Chinaman with a stout rattan cane in his hand. He seldom has to use his stick; but when he does, it means that the recipient has to lay up for a week or two for alterations and repairs. The average pay of the Chinese coolie at the mines is 40c. (Mexican), or about 20c. gold a day; but in most cases they are put on piecework, and receive so much per cubic foot of earth excavated, according to the hardness of the formation in which they are working. The richest stratum in which tin is found is a stiff, clayey gravel, exceedingly difficult to treat, for which they receive as much as 5c. a foot. But unless working on his own account, the Chinaman never saves a cent, his small earnings going in food and opium, and any surplus that may remain is quickly absorbed at the gambling table.



SIAMESE WOMEN PANNING TAILINGS

ELEPHANT TRANSPORTATION

Labor, Climate and Transportation

The economic value of the Chinese coolie has already been recognized, and, in this class of work—the digging and hauling of dirt—he stands, for cheapness and adaptability to climatic conditions, pre-eminent in the field of competition.

One point which impresses itself strongly on any practical man observing their operations, is the complete absence of mechanical means of treating and separating the ore. Frequent delays are caused by this, and there is no doubt that the difficulty they experience in handling the slag in smelting, is occasioned by the impurity of the ore they put into the furnace. However, this is only one of many points in connection with tin mining in Siam, according to Chinese methods, that are capable of improvement and in a brief outline such as this it is impossible to enumerate them minutely; but sufficient evidence has been shown for the need and opportunity for western skill to promote an industry that is already flourishing in spite of these conditions. It must not be supposed that in a country like Siam the way is paved for the American or European prospector to step in and make his choice; on the contrary, the adverse circumstances which prevail in all tropical countries are here abundantly multiplied. The climate of the Peninsula, though not so deadly as in other parts of Siam, is one which the white man can take no liberties with, and one requires an extraordinary amount of patience to submit to the delay and inconvenience of travel through a country where roads have yet to be made and where the apathy and polite indifference of the native official, on whom he has to rely for transport, is proverbial.

The common means of transport is by elephant, the hire of an animal with attendant varying from 5 to 10 ticals per day. It is surprising what a small load these huge beasts will carry, three piculs of tin, or about 400 lb. being considered the limit for a large animal; and from 15 to 20 miles a day's journey. Most of the tin is conveyed to the coast towns by

native boats along the shallow, rapid rivers, which during the rainy season flood the whole country, and exclude several districts from traffic of any sort for weeks together. A complete stock of provisions has to be carried wherever one travels, for the natives of the rural districts subsist almost entirely on rice and salt fish, with condiments, which are not at all palatable to the European taste. But in spite of these drawbacks, a more varied and interesting country does not exist in the East; and with the generous and free-minded policy the Government is pledged to adopt, giving equal rights to all foreigners, and including various schemes for the development of the country by road and railway, the future of these Malayan States is fraught with the brightest promise for various commercial enterprises in which tin mining will, of course, lead as the crowning industry.

Railroad Extensions in Oaxaca

Consul-General A. L. M. Gottschalk, of Mexico, reports that there is pending a negotiation which will soon furnish the State of Oaxaca with much-needed transportation facilities. The State at present has but one railroad of importance, the Ferrocarril Mexicano del Sur, which runs from Pueblo direct to Oaxaca. From Oaxaca there are three small narrow-gage country railroads, the Ejutla, Oriente, and Agricola, which are intended only to tap neighboring agricultural and mining sections and which are but poorly provided with rolling stock, having wood-burning engines, and are not particularly well managed.

American capitalists are now negotiating to buy the three small agricultural railroads mentioned as running out of Oaxaca, with the idea of placing them under one management and prolonging the system eastward to Salina Cruz and westward to some Pacific port near Acapulco. It is stated upon reliable authority that this deal is practically concluded.

There is also some talk of the same group of capitalists purchasing the San Rafael y Atlixco Railroad, a small road now running from the city of Mexico to Apapasco and Ozumba, and later intended to reach Atlixco itself. This road, it is said, would, in the hands of the capitalists mentioned, be prolonged to cross that part of Oaxaca which is known as "La Mixteca," a distant, inaccessible region of Indian villages situate in a most fertile agricultural section, where a great number of prospectors state that there are iron, coal, and large deposits of lead ore.

Japan imports zinc from other countries, but the figures for 1906 are lower than those for 1905, being 6314 tons, valued at $1,024,000, for 1906, as compared with 14,012 tons, valued at $2,006,000, in the preceding year.

Greenwater, Cal.

A correspondent of the New York *Sun* thus reports recently from Greenwater:

If there had been as much knowledge of mathematics among the citizens of this flourishing desert town as there are fleas, Chuckwala Charley Hennessy's drink emporium, the Death Valley Vault, would not have burned to the ground Sept. 9. Because the leading citizens in this town are not as quick at figures as they are at raising before the draw Greenwater has been robbed of its chief center of moral and social uplift. Today the boys are admitting that mental arithmetic beats presence of mind.

Chuckwala Charley's saloon burned because the leading members of the community could not figure out on the spur of the moment whether it would be cheaper to let the place burn and rebuild it with lumber at $80 a thousand feet or to put the fire out with water costing $8 a barrel. While the discussion went on the fire got so far that the party in favor of water were squelched by force of circumstances.

The situation in Greenwater is unusual. Some months ago a real estate boomer put an advertisement in a Los Angeles paper which said that Greenwater was a garden spot of the desert, kissed by the warm and healthgiving rays of a perennial sun and blossoming like the rose.

He was right about the kisses. The average sun kiss here in the north end of Death Valley registers about 125 deg. F. 10 months out of the year and occasionally the Death Valley *Dead One* has to suspend publication because its ink rollers melt. As for the garden business, there is a fine collection of tomato cans out back of Sandy Hedges's place and the Joshua tree grows plentifully in these parts.

Since a misguided mortal picked out this site for a town about a year ago because he grubbed up some copper outcroppings down where the foot of the main street now is, quite a few individuals have come here to take the parboiling treatment and prospect for more copper, some gold and grub to eat meanwhile.

They usually take a good wash at Mojave before coming into the valley and if they live to get back to Mojave they take another wash at the end of the journey in Mike Stetson's commodious rain barrel. Only those fellows who bet $500 on a busted flush before the draw can afford to take a bath all over in Greenwater. But right here mention must be made of the enterprise of Chuckwala Charley that endeared his emporium to the populace.

When Chuckwala put up the Vault he painted a sign and hung it behind the bar. "Free Wash With Every Drink," the sign read. And Chuckwala stuck by his contract.

After you had bought your two fingers of squirrel whiskey and paid extra for a water chaser, if you felt you could afford it, all you had to do was to go out back of the saloon, and there a China boy would pour out about three inches of real water in a washbasin and you could loosen the surface crust on your face. The wits in town called this a homeopathic bath. Chuckwala's homeopathics made an instant hit with the citizens, and the custom of taking a wash had grown up about the Vault until it was recognized as one of the features of Greenwater's social life.

Copper in Australia

SPECIAL CORRESPONDENCE

The fall in the price of copper has naturally caused considerable uneasiness, and the consequent drop in the value of stocks has been a matter of much concern. Most of the Australian mines are working under an agreement which provides for a substantial advance in wages, amounting to upward of 12½ per cent., while copper remains over £70 per ton, and should the price fall below this level it is safe to predict that great industrial unrest will follow. The official figures just published show that the exports of copper during 1906 from Australia were as follows: Ingots, 17,939 tons valued at £1,548,767; matte, 19,278 tons valued at £1,449,308; ore, 1674 tons valued at £34,189; a total of £3,032,264.

The rapid advance made by the copper-mining industry in the northern State of Queensland is shown by the return for the quarter ending June 30. The quantity of copper produced during this term is given as 3219 tons valued at £317,875, as compared with 2229 tons valued at £190,075 for the same period in 1906. The Mount Morgan mine alone contributed copper to the value of £123,782 as the result of the three months' operations, and the following table gives unmistakable evidence of the strides made since copper became an element in production at that mine:

Half-year ending	Gold won. oz.	Copper won. tons.
November, 1905.....	62,281	125
May, 1906.....	54,916	358
November, 1906.....	72,716	1,923
May, 1907.....	72,422	2,164

The Electrolytic Refining and Smelting Company of Australia is erecting works at Port Kembla, New South Wales, and the blister copper from the Mount Morgan and other large mines will now be refined here instead of shipping it to the De Lamar works as hitherto.

The Yukon Legislature has appointed a committee to memorialize the Canadian government regarding the Boyle mining concession, the largest in the Klondike camp, covering 40 sq.m., which is partly owned by the Guggenheims, asking an investigation as to how it was acquired and the conditions under which it is to be held.

Unwatering by Means of an Inclined Skip

By Douglas Muir*

A company purchased a mine with the object in view of unwatering it to get at the milling grade of ore left from previous operations. The mine workings consisted of a drift-tunnel about 700 m. along the vein, the dip being approximately 50 deg., with a number of stopes and winzes on the vein where rich ore shoots had been encountered and the ore summarily removed. The ore had been removed from the largest shoot, leaving a stope 20 m. high, and a winze 120 m. down from the level of the drift tunnel. It was desired to unwater at this point. The mine had been abandoned some years and all the lower workings were full of water to the tunnel floor.

With the conditions as briefly stated above, a hoist and inclined skip were available for unwatering the mine.

The winze was located 90 m. in on the tunnel. The first 60 m. of the tunnel had been driven on fairly good grade. The last 30 m. was on 8½ per cent. grade. This part was shot out to grade and track laid in the tunnel. At a point 8 m. before reaching the winze the roadway was given a curve and driven out into the footwall, past the winze, back into the old line of tunnel and about 3 m. below its level. Here bins were placed to receive ore which might be mined further in on the vein. Tracks were laid on into the tunnel, grade being permissible.

The roadway past the winze was driven under old filled stopes. The filling was held up with stulls and sets, lagging being driven in on top of these. Eight feet before reaching the winze, heavy sets were put in and a wall raised up into the stope, cutting off and holding back the filling. A similar wall was placed at an equal distance beyond the winze. The stope filling between these walls was removed and trammed out. This left a clear and safe open space in the stope directly above the winze in which to do work for hoist installation. The roadway directly in front of the winze was then widened out into a bench or pocket in which to place ore bins and water chute for the skip to dump into.

In front of the winze and 9 m. up in the cleared portion of the stope, a crosscut was driven into the footwall and at right angles to strike of the vein. At its terminus the crosscut was enlarged, giving a small room where the hoist was placed, the foundation bolts being leaded into the solid rock. A thin layer of concrete was laid on the floor to give level setting for the hoist. Fig. 1 shows manner of supporting head-frame pulley; also ore-

*Manager, Cinco de Mayo Mining and Smelting Company, Descubridora, Durango, Mexico.

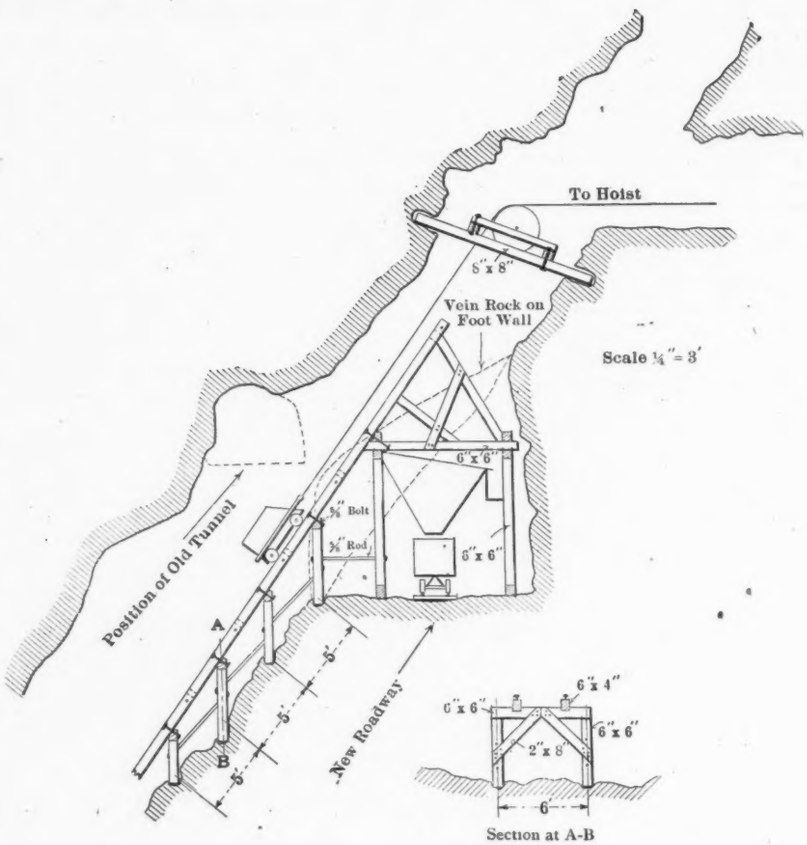


FIG. 1. PORTION OF PERMANENT TRACK IN PLACE

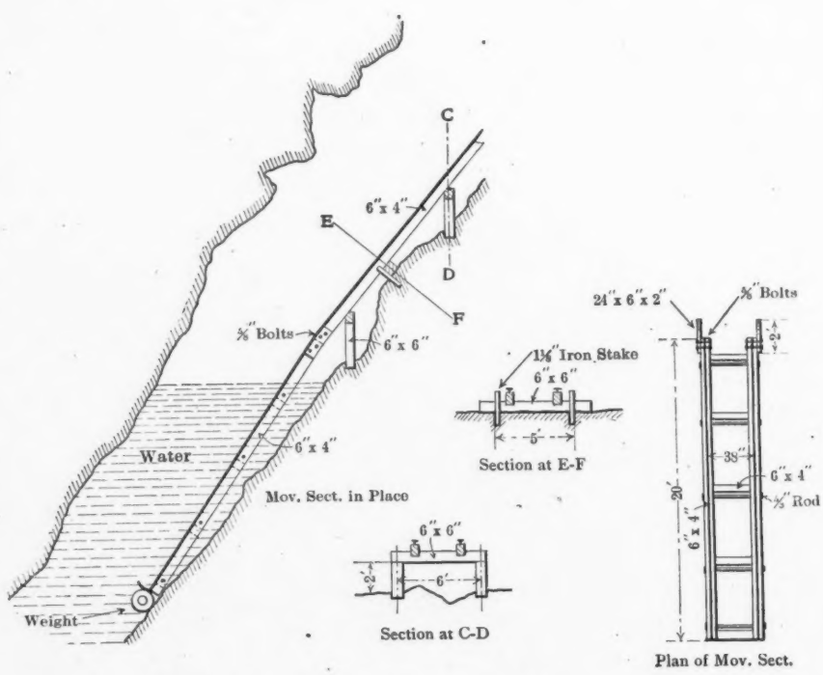


FIG. 2. TEMPORARY TRACK USED FOR UNWATERING INCLINED WORKINGS

bin supports and upper part of track way.

With the driving of the roadway on the new level the water in the winze had fallen to the same level. A few more meters were pumped out by hand for starting work of track building. The winze varied in size, being from 3 to 17 m. in breadth (along the vein) and 2 to 5 m. in width (perpendicular to the walls). The walls being very hard and standing well, heavy timbering was omitted and trackway only was laid as shown in the diagrams.

Hitches or steps were cut in the footwall to receive frames which were of 6x6-in. lumber. On top of these were bolted longitudinal stringers 6x4 in. section. The track was spiked directly to the stringers and intermediate between the frames were placed cross-braces and rods to prevent spreading. The trackway was elevated at the start to give dumping room, but was gradually lowered to within about 2 ft. of the footwall. This small space was left to provide clearance for any irregularities or humps of vein matter which might be encountered and thus obviate shooting them out. The trackway was built to the water's edge and a movable section of track then shoved down into the water and bolted securely to the part of trackway in place. Fig. 2 shows trackway, giving its general hight above footwall and also shows movable section in place with dimensions. Also, as shown in Fig. 2, wherever it was possible, the frame was omitted, iron stakes being driven into drill holes. These stakes supported 6x6-in. sticks onto which 6x4-in.track stringers were fastened with 10-in. lag screws. This simplest kind of construction was adopted for trackway owing to the urgency of the work and the shortage of lumber.

The movable section being bolted in place, the hoist was started and the water removed to the bottom of this section and held there while hitches were cut or holes drilled for new supports. The section was then removed and a piece of permanent trackway built in. The movable section was then lowered again into the water and the operation repeated.

Copper in Jamaica

In a report from Kingston, Consul F. Van Dyne says that numerous attempts have been made to work copper deposits in Jamaica, beginning as early as 1857, but they have not hitherto proved successful. An American mining engineer has been prospecting since last November, and another attempt is now to be made. The deposits are located principally in the parish of Clarendon. Two thousand acres of land have been acquired by the interests which the mining engineer represents, and shafts have been sunk in three places —in one place to a depth of 300 feet.

Insoluble Silicious Residue

H. C. Parmelee (*West. Chem. and Met.* III pp. 115-117) discusses the determination of insoluble silicious residue. The use of the term insoluble is exceedingly vague and in order for different chemists to arrive at concordant results, it is necessary to adopt some uniform method for its determination. The author calls attention to three points in the determination: (1) merely putting an ore into solution does not necessarily throw out all of the insoluble matter, and the quantity of insoluble matter throughout will vary greatly according to the time of treatment and strength of acid; (2) that it is necessary to evaporate to dryness to obtain constant results on the same ore; and (3) that all of the insoluble silicious residue is not thrown out by one evaporation and that a second evaporation of the filtrate is necessary to obtain all of the silica and other insoluble matter.

The author's definition is that insoluble silicious residue is that portion of a mineral substance remaining insoluble after the following chemical treatment: solution in hydrochloric and nitric acids, with subsequent evaporation to dryness, filtration, washing and ignition of the residues.

Oxidized Ores

Weigh 1 gram of the ore into a No. 1 beaker, add 15 c.c. hydrochloric acid, cover with a watch glass, and digest at a gentle heat until the ore appears to be quite decomposed, add a few drops of nitric acid, heat until action has ceased, and then wash off the cover with a fine jet of water, and evaporate to dryness. Redissolve in hydrochloric acid and evaporate to dryness a second time to render all the silica insoluble. Redissolve in 10 c.c. hydrochloric acid and 30 c.c. water, filter, transfer all the residue to the filter with a fine jet of cold water, using a policeman, and wash the filter with a little hydrochloric acid and plenty of cold water. Ignite and weigh the residue as "insoluble silicious residue."

Complex Ores Containing Sulphides

Treat a weighed portion (0.5 gram) of the ore with 10 c.c. nitric acid (sp. gr. 1.20) and heat gently until the first intense action ceases and the sulphur has separated out in a clear yellow ball. If the decomposition occurs too violently, due either to too strong acid or too great heat, the sulphur ball will probably include some ore and require to be treated separately. If this occurs it will usually be found better to start a new determination. After the effect of the nitric acid is exhausted and the greater portion of it evaporated off, add 15 c.c. hydrochloric acid and evaporate to dryness; take up with 15 c. c. hydrochloric acid (1—1), boil, filter and wash; evaporate the filtrate to dryness, treat as before, adding the second residue to the first. Wash clean with hydrochloric acid and hot water, ignite and weigh as insoluble silicious residue.

Coal and Coke in Tennessee

The official report of the State Inspector of Mines of Tennessee gives the production of coal in the State for two years past as follows, in short tons:

	1905.	1906.	Changes.
Coal mined, tons	5,552,576	6,272,457	I. 719,881
Value at mines..	$6,496,865	$7,565,286	I. $1,068,421
Average per ton.	$1.17	$1.20	I. $0.03

The average number of days worked, taking all mines, in 1906, was 231. The amount expended in mine improvements was $279,547. Miscellaneous statistics show 1231 draft animals and 13,175 mine cars in use. Explosives used were 118,954 kegs of powder and 125,761 lb. dynamite. The average coal mined to each employee underground was 699 tons; to each employee, including surface men, 584 tons.

Mining machines were in use by 17 companies, the total number of machines at work being 140. The average coal mined per machine was 5482 tons. The total coal mined by machine was 767,456 tons, or 12.2 per cent. of the total.

Employees and Accidents

The number of employees at coal mines reported in 1906 was: Inside mines, 8969; on surface, 1767; total, 10,736. The total amount paid in wages was $4,844,266, being 64 per cent. of the value of coal at mines. The average earnings per employee were $451.22. The report states the average wages paid at $2.07 per day.

The number of fatal accidents and their causes are given as follows: Falls of roof, coal, etc., 20; mine cars, 3; powder explosion, 2; incline, 2; gas explosion, 1; shatt. 1; tipple, 1; unknown and miscellaneous, 3; total, 33. This is 3.07 deaths per 1000 employees. Falls were responsible for over 60 per cent. of the accidents.

Coke Production

The quantity of coke made during 1906 was 484,672 short tons. The coal used in making coke was: Unwashed slack, 73,454 tons; washed slack, 516,804; washed run-of-mine, 341,383; total, 931,641. It will be seen that 92 per cent. of the coal was washed before going to the ovens. The average yield of coal in coke was 52 per cent.; that is, 1.92 tons of coal were consumed in making a ton of coke. The value of the coke made was $1,350,629 at ovens, an average of $2.79 per ton.

There were 17 coke plants, including 2717 ovens. The number in blast during the year was 1692 ovens; the average time at work, 282 days. The average output of coke per oven was 286 tons. There were 80 ovens built during the year, and 78 under construction at its close. The number of employees was 544, and they received $195,725 in wages, an average of $359.79 per year.

Titration of Zinc in Alkaline Solution

By Edgar B. Van Osdel*

Some time ago I made some comment upon experiences in the titration of zinc by potassium ferrocyanide in ammoniacal solution, keeping iron in solution by means of tartaric acid or a tartrate and using the iron as an indicator with acetic acid upon the spot plate. Ores containing large percentages of iron, however, are not suitable for such treatment, since the dirty color produced by the acidification on the spot plate masks the faint end reaction of prussian blue. To remove the iron the standard method by Low may be employed, evaporating to dryness with potassium chlorate and nitric acid, diluting with, and after filtration washing with solution of ammonium chloride and ammonia.

Instead, however, of acidifying, boiling to decompose chlorates and double neutralization before titration, we may proceed at once to titration in alkaline solution by simply dissolving a small quantity of ferric chloride in the acetic acid used upon the spot plate. The solution must be distinctly ammoniacal but not excessively so. If the solution to be titrated is too nearly neutral the end reaction lacks sharpness and if too strongly alkaline the zinc is not precipitated. If a solution of 100 c.c. ammonia and 100 grams ammonium chloride to the liter is used for dilution and washing the titration will be satisfactory. Small variations in the amount of ammonia do not affect the standard and if decomposing containers are filled to a certain depth and similar conditions observed in washing, the results will be uniform.

Details of the Method

An outline of the process which is a modification of Low's standard method follows: One-half or one gram of ore is decomposed with 10 to 15 c.c. nitric acid, preferably in an Erlenmeyer flask of Low's special funnel-neck form, and as soon as red fumes cease to appear, 10 grams potassium chlorate is added. A convenient method of doing this is to use an annealing cup, size *B*, which has been made into a dipper by the addition of a handle of stiff wire. When shaken down level this holds almost exactly 10 grams and its contents may be quickly and easily transferred to the flask. More or less of the chlorate does not affect the result.

The contents of the flask are boiled to dryness, cooled and a certain amount, 25 or 35 c.c., of the zinc wash added. The wash contains 100 c.c. ammonia and 100 grams ammonium chloride to the liter. The flask is returned to the fire, its contents brought to a boil and poured upon the filter catching the filtrate in an 8-oz. beaker. The flask is rinsed three times with as little hot water as possible using the mouthpiece of the wash bottle for its delivery. When this has run through, the precipitate is washed twice with hot zinc wash from a wash bottle, using enough to fill the paper to a depth of about one inch above the point. When this has run through a third wash of hot water, again using the wash bottle inverted, is used. After the filter has drained and the filtrate has been heated to boiling it is ready for titration.

The Titration

The solution should be divided as usual and after the end point is passed all of the other half is added except enough to require 1 c.c. for titration. The standard solution may then be added 1 c.c. at a time until the end point is again passed when the whole is returned to the original beaker and finished carefully 0.1 c.c. at a time. A light blue color appears instantly with two drops excess.

The indicator is prepared by adding to glacial acetic acid a few cubic centimeters of solution of ferric chloride. The color must not be strong enough to mask the end reaction but should be sufficient to obscure any bluish tinge produced by copper in solution.

Each depression of the spot plate should contain 0.3 or 0.4 c.c. of the indicator to insure acidity when 1 or 2 c.c. of the solution are withdrawn with a hollow rod. The ordinary spot plates have too shallow depressions. A convenient one is made by pouring melted paraffin into a cigar box to a depth of 0.5 to 0.75 in. and cooling as rapidly as possible to produce a uniformly white color. When cold, depressions of any desired depth can be bored with a small spatula.

Since copper is not precipitated in ammoniacal solution when potassium chlorate and zinc salts are present, its removal is unnecessary. In any event the addition of a small amount of potassium hydrate would absolutely prevent interference.

If all solutions and wash water are hot a run of zinc determinations can be made in an hour. In order for the standard solution to equal 1 per cent. for each cubic centimeter it should contain 66 grams to the liter.

Tests have been made with a view to using uranium acetate in acetic acid as an indicator but without success.

*Frisco Mining Company, Ltd., Gem, Idaho.

When the conversion of the locomotives of the Mexican Railway into oil burners is completed it will cause another decrease of British coal imports into Mexico. At present the patent fuel and coal used on the engines are imported from Wales.

John Stanton

A bronze bust of the late John Stanton was recently presented by members of the Stanton family to the Memorial Library at Painesdale, Mich. The bronze was a composite made from Baltic, Mohawk, Atlantic, Wolverine and Michigan copper. Acting for the trustees of the library William A. Paine accepted the memorial, and in the course of his remarks said:

"John Stanton had to an unusual degree a profound sense of his responsibilty as trustee for all the stockholders in the companies which he had in his charge. He was not a manager, as too many are nowadays, to use the position for his own personal profit. He was rather the faithful steward, using all the talents entrusted to him solely for the mutual benefit of those from whom he had received them. The moderate fortune which he accumulated during his lifetime was only a small fraction of the total amounts which were gained in the enterprises which his genius and faithfulness brought to success. His works will follow him through all eternity, and it is for us who so largely inherited the fruits of his labors to build our success only on these foundations which he has laid.

"The bust will be placed here in this reading room, and it is peculiarly fitting that it should face the Atlantic mine; for it was not the rich, strong and successful children of his mining household, like the Baltic, Wolverine and Mohawk, that were really dearest to his heart, but it was the poor Atlantic more than any other that was his best beloved child."

Platinum in Colombia

Writing from Cartagena, Consul I. A. Manning states that the platinum industry in Colombia is attracting considerable attention from abroad. Recently a French Company, headed by Albert L. de Lantreppe, of London, has made some heavy purchases of mining properties. They are soon to send engineers to make a study of the platinum region. Other capitalists have also recently secured large holdings, which they expect to develop scientifically. It is said that these companies will make an effort to find whether platinum is found in quartz lodes as well as in placer ground, the latter being the only source of the present supply.

The platinum of Colombia has been found only on the headwaters of the Atrato river and the Rio San Juan in the State of Cauca and near the Pacific coast of Colombia. Most of these deposits are also gold bearing and they have been worked for a good many years, principally for gold.

Mexican Freight Rates

Consul W. D. Shaughnessy writes from Aguascalientes that the contemplated changes in freight rates, which were to have taken effect on Aug. 9, are still pending, waiting the approval of the Mexican tariff commission. The new classification and freight tariff were published and distributed, but the many serious objections raised against them have so far prevented their being approved and have been the means of commencing what promises to be a warm controversy between the railroads and the mining and smelting interests. The mineral interests are foremost in combating the proposed raise in the rates, as they are to be more seriously affected than the agricultural and mercantile interests.

In some cases the rates on certain classes of ore have been advanced as high as 169 per cent., while the average increase is as high as 57 per cent., according to the distance transported. As the greater part of the Mexican mines are of the low rather than of the high grade, the ores now being shipped will not produce enough revenue under the proposed rates to warrant their operation.

How Mines Will Be Affected

For an example, in the southern part of Mexico there is a low-grade mine near a town of 12,000 population, the inhabitants of which are greatly dependent upon its operation. The ore is shipped to the smelter and sold at $20 Mexican per ton, yielding a profit of $4. The present freight rate is $4.25 and the proposed rate is $8.38. As the operators are producing the ore at the lowest possible expense and as they are selling it at the maximum rate to the smelter, it will be impossible for the mine to continue its operations with an increase in the freight rate of 97 per cent.

Quoting another instance, a company, of which the operators are Americans, has expended nearly $5,000,000 in a number of years, without any profit from its operations. Large concentration works have been erected and the mines have practically arrived at a profitable basis, producing at this time about 12,000 tons of ore monthly, but the proposed freight rates will place them where they were before and probably cause their abandonment.

At present large amounts of copper matte are shipped from El Paso to Aguascalientes for smelting under a rate of $7.84 per ton. Under the proposed rates of $15.86 per ton it will be more economical to smelt this matte in the United States, thus decreasing the smelting in Mexico and causing a hardship upon certain large silver mines whose ores are smelted by the aid of this matte.

The following table illustrates the radical nature of the proposed changes in matte rates from stations from which matte is shipped to Aguascalientes.

Aguascalientes from—	Kilometers.	Rate Paid per 1,000 kg.	Proposed Rate per 1,000 kg.
San Luis Potosi	225	$3.18	$7.73
Cavitas	231	3.21	7.88
Salamanca	253	3.32	7.51
Celaya Junction	296	3.53	9.50
Tlaxcoapan	521	5.20	12.06
Torreon	551	5.51	12.31
Stalforth	923	12.18	17.40
Rosario	944	12.83	18.11
Terrazas	1,064	7.84	14.56
El Paso, Tex	1,386	7.84	15.86

It is estimated that there are and have been for many months 100,000 tons of ore piled up on the railroads awaiting shipment to the smelters, owing to the inability of the railroads to accommodate the producers of ore. These ores have been mined in view of the present rates, the cost of their production being calculated on that basis; therefore any increase in rates if applied without ample notice to miners will be unjust and injurious.

No Margin on Some Ores—Average Rate Increases

Under the proposed ore tariffs the lowest rates apply upon ores the value of which is not greater than $25 per ton, this value being determined after deducting the charges of the smelter from the gross value of the metals contained. As a great many ores cost at least $25 per ton to extract and haul to the railroad by carts or mules, there is no margin left for the miner to derive a profit and pay the railroad rates.

During the 12 months from May 1, 1906, to April 30, 1907, the ores received by the American Smelting and Refining Company from Mexico aggregated over 600,000 metric tons, of which 16.5 per cent. would be subject to rates under the first class, 43.3 per cent. under the second class, and 40.2 per cent. under the third class. The proposed rates constitute increases over the present rates of 57.5, 46.6, and 34.1 per cent., respectively, in the first, second, and third classes. The amount of increase in money which the new rates will occasion to be paid upon the ores and mattes shipped from all shipping points to the American Smelting and Refining Company's plants, all of the ores being mined in the Republic of Mexico, are as follows, the figures being based on one year's business from May 1, 1906, to April 30, 1907: Actual freight paid, $6,047,872; freight payable under new tariffs, $8,719,298; proposed increase, $2,671,426; percentage of increase, 44.17.

Increased Rates Greater Than Tax Concession

Large tonnages of ores are being shipped now from the mining districts of Monterey, Chihuahua, Sierra Mojada, and Parral, on which the margin between profit and loss is very small. These ores are becoming lower in grade every year, and to these mines increases in freight will become very serious. The increase in freight cannot be absorbed by the smelters, which are helping them at the present time in order to assist their operations.

The mining industry has always supported a very considerable tax in the matter of Federal, State and general taxes, and at the time of inaugurating the monetary system it was considered advisable by the Federal Government to aid this industry by a reduction of taxes; but this aid, substantial as it was, will be more than offset by the increase in freights on mineral products. The entire Federal tax as now assessed on ores coming to the smelters is far less than the proposed increase in freight on these ores under the new tariffs.

In petitions submitted to the tariff commission by the Mexican Central and Mexican National railroads, they state that since their inauguration the passenger and freight rates have constantly decreased. The Mexican dollar, being practically at par at their formal beginning with the American dollar, is today at a value of 50 cents, and as the railroads have to pay the interest on their bonds in gold, the conversion from Mexican money makes the net earnings and amounts available for fixed charges much depreciated. They calculate that 35 per cent. of the operating expenses must be converted into American money for the purchase of materials which come from the United States. Consequently double the amount of Mexican money is required.

Higher Cost of Materials—Comparative Revenue

It must be borne in mind that at the same time the acquisitive value of the Mexican dollar has diminished, the cost of all materials has increased, the better part of the latter being of foreign origin and their prices in gold. Under their original concession their importations were exempt from customs duty. Since the concessions expired, duties have to be paid aggregating nearly $400,000 per annum.

Wood has become scarce, and the price of coal in the last 10 years has increased from $6.50 to $8.17, or 25 per cent.; price of pine ties from 40 to 80c., and oak ties from 75c. to $1.15. Salaries have increased yearly during the last 10 years and it is presumed the increase during this year will be over $1,000,000.

Large amounts have been expended in necessary and permanent improvements, and further expenses of a similar nature will have to be made to hold the proper efficiency and to extend them according to conditions. The railroads must keep pace with the progress of the country, and to do this they claim it is necessary to in-

crease their revenue, i.e., to increase the rates of transportation.

According to the official reports published by the railroads, 50 per cent. of the transportation in Mexico is for ore, matte, bullion, and fuel for the mineral interests. As mining and smelting is one of the most important industries from which Mexico derives a large revenue, the fact that the proposed rates will undoubtedly diminish rather than increase the income is not likely to lead the Government to approve them.

On the other hand, the railroads petitioned to increase the rates on practically the same points, with the same figures, at the same time, and with tariffs and classifications worded practically identically. Therefore it appears that they have confidence in the Government supporting them to a great extent, as the Mexican Government owns the controlling interests in all the railroads excepting two—the Sonora Railroad and the Kansas City, Mexico & Orient Railroad.

There is no doubt but that the railroad rates will have to be increased, but to advance them to such alarming proportions as the proposed rates advocate and without sufficient notice being given to the shippers will be extremely serious and constitute a severe blow to the mining industry.

Glass Telegraph Poles

Consular Agent Gustav C. Kothe, of Cassel, states that an architect of that city has been granted patents for an invention for the manufacturing of glass telegraph and telephone poles. A stock company has been organized and a factory has been built at Grossalmerode, near Cassel. The glass mass of which the poles are made is strengthened by interlacing and intertwining with strong wire threads.

One of the principal advantages of these poles would be their use in tropical countries, where wooden poles are soon destroyed by the ravages of insects and where climatical influences are ruinous to wood. The selling price of the poles has not been fixed yet, but the company is willing to accept 25 marks ($6) for a pole of the length of 7 m. (about 23 ft.). The Imperial Post Department, which has control of the telegraph and telephone lines in Germany, has ordered the use of these glass poles on one of its lines.

According to the *Iron Age*, a German electrician has discovered that bare aluminum wire may be used in winding magnet coils, solenoids, etc. Advantage is taken of the fact that aluminum soon becomes coated with oxide which requires a potential of 0.5 volt to break it down, and so the oxide acts as an insulator. It is necessary, however, to insulate one layer of turns from another, as the difference in potential between them is greater than that between adjacent turns.

Gold Production of Australia

SPECIAL CORRESPONDENCE

The gold yield of Australia for the seven months ended July 31 was less by 8.6 per cent. than that reported for the corresponding period in 1906. The following table shows the production by States, in fine ounces, South Australia and Tasmania being estimated:

	1906.	1907.	Changes.
Western Australia	1,054,723	965,808 D.	88,915
Victoria	433,068	383,381 D.	49,687
Queensland	298,001	260,513 D.	37,488
New South Wales.	152,108	160,689 I.	8,581
Tasmania	37,800	32,000 D.	5,800
South Australia	8,000	11,000 I.	3,000
Total, oz. fine g'ld	1,983,700	1,813,391 D.	110,309
Total value	$41,003,079	$37,482,792 D.	$3,520,287

Of the four important gold-producing States it will be noticed that New South Wales is the only one to exhibit an increase, and that a small one. The returns from Western Australia, show the lower grade of the ore which is being mined, and as this ore has now to be depended on for the maintenance of the output, a further shrinkage in the yield must follow. In the State of Victoria the grade of the ore won by some of the principal mines is also much below that of previous years. The half-yearly report of the New Moon mine, Bendigo, which has been one of the most consistent producers on this field, shows that the average of the ore won during the last term fell. The Long Tunnel Company, Walhalla, reports a satisfactory half-year, gold to the value of £31,462 having been won, and dividends £21,600 distributed. This company has now returned to shareholders a total of £739,680 on a paid-up capital of £53,800. The Government of Victoria has come to the assistance of the company engaged in attempting to prove whether the extension of the Berry lead at Moolort is auriferous, and an advance of £8000 has been made to enable operations to be further prosecuted. Altogether some £500,000 has been spent by British investors since 1898 on the three associated mines—the Loddon Valley, Moolort, and Victorian Deep Leads—and only in the Loddon Valley mine has it been possible to get into the wash.

In the State of Queensland all the principal fields record decreased returns, but the marked attention which is being devoted to the mining of the industrial metals has much more than made good the deficiency.

The gold mining industry in New South Wales continues to make slight headway, and the output is being contributed by the established mines. At the True Blue mine, Wyalong, developments at the 1100-ft. level have been most satisfactory. The lode is 9 ft. wide, and for a width of 2 ft. 6 in. bulk assays of from 10 to 20 oz. of gold per ton are reported as having been obtained.

The Electrochemical Industry in France

Consul William H. Hunt, reports from St. Etienne on the electro-chemical industries of France. There are several electrolytic copper refineries, notably at Eguilles, near Sorgues, in Vaucluse, belonging to the Société de Cuivre de France, producing two tons a day; and Givet, in Ardennes, with a production of seven tons daily. At Dives, in Calvados, the Emore process, produces directly 12 tons daily of plates and tubes of copper.

The decomposing of water into hydrogen and oxygen is exploited by the following concerns: Usine de St. Vrain, near Ballancourt; employs the Hazard-Flamand process, and produces 200 cu.m. of hydrogen and 100 cu.m. of oxygen per day. La Société Oxydrique Française utilizes in its factories at St. André, near Lille, and Villeurbanne, near Lyon, the Garuti process, in which the cathodic and anodic compartments are separated by an iron partition pierced with a multitude of small holes. The daily production of these works is about 400 cu.m. of hydrogen and 200 cu.m. of oxygen.

The Electro-Chemical Company furnishes hydride of lime (CaH), which gives off hydrogen in contact with water. This substance, which sells at present at $1.93 per kg., is commercially known as "hydrolith."

In the manufacture of soda by the electric process, the Volta company, whose works are situated near Moutiers, utilizes the Outhenin-Chalandre process, and turns out 800 tons of soda and 2000 tons of chloride of lime per year. About 4000 tons of caustic soda are manufactured annually by this method in France. Chlorate of potash is manufactured at St. Michel de Maurienne by the Gall process, and at Chedde, near Chamonix, by the Corbin and Lederlin method. The total production is about 7000 tons annually.

Aluminum is produced principally by three companies, that of Chemical Products, of Alais and the Camargue; at Calypso and St. Felix, near St. Jean de Maurienne; the French Electro-Metallurgic Company, at St. Michel and Chedde, near Chamonix. The total annual production is estimated at 6000 tons.

Carbide of calcium is manufactured on a very large scale in France. Numerous companies employ electricity in the production of ozone, used as an oxidizer in the preparation of certain organic products—vanaline, heliotropine, essence of hawthorn, etc. It is estimated that the electro-chemical industry in France, now uses 100,000 h.p.

Autogenous welding is successfully applied by Robert Hopfeldt, a German electrician, to the soldering of aluminum wires, a direct union of aluminum with aluminum being readily obtained.

The Camp Bird, Ltd.

SPECIAL CORRESPONDENCE

The report of Camp Bird Ltd., for the year ended April 30, just issued in London, contains some information relating to the future of this Colorado mine which is not altogether reassuring. Mr. Beatty states that developments at depth have so far shown only small irregular bodies of pay ore, and his policy is to develop the upper levels of the mine from the general horizon of the Chicago tunnel. This barrenness of the lower levels causes the market in the shares to be very restricted. There is, of course, no immediate danger of any cessation of profits, for there is blocked out, or already broken, some 200,000 tons of $35 ore that should produce $3,500,000 profit. Before this has been milled, further discoveries may be made in the upper levels, or at depth.

During the year covered by the report, the new mill was in operation only during the second six months. The ore treated was 39,476 tons wet, yielding values of $1,273,475 gold, $44,198 silver and $22,114 lead. The total earnings were $1,341,513, and the operating expenses $416,201, leaving a profit of $925,312. Out of this $188,327 was paid over to Mr. Walsh, and various London and other expenses paid, leaving a net profit in London of £139,030. Out of this £29,310 has been written off the company's holdings in the Imogene Basin Gold Mines Company, and £102,500 has been distributed as dividend, which is at the rate of 12½ per cent. for the year.

Mining at Broken Hill, New South Wales

SPECIAL CORRESPONDENCE

The half-yearly reports recently published by three of the companies operating on the Broken Hill field illustrate in a marked degree the satisfactory results which have been secured during this period. The ore won was 445,095 tons; the net profits earned amounted to £446,929, and the dividends paid came to £362,000. It will be noted that the profit per ton of ore raised averaged £1 0s. 11d. Each company records that the working costs are higher on account of the increased wages paid and the price of water, and in the case of the Broken Hill Proprietary Company the increase in wages amounts to 2s. 2d. per ton of ore raised. It is pleasing to be able to state that good rains have fallen, and that the threatened difficulty of the water supply to this field has thereby been removed.

The production of the Proprietary Company for the half-year was silver, 2,695,800 oz., and soft lead 29,383 tons. The gross profit during this term amounted to £314,284, and the dividends paid were £240,000, thus bringing the amount distributed by this company to its shareholders up to £11,136,000, on an authorized capital of £384,000. The fire in Block 11 still continues to smolder, but has in no way interfered with underground operations. Development work has been actively carried on at the 1000, 1100 and 1200-ft. levels. The lode at the lowest level averages 30 ft. wide, having a value of silver 10.5 oz., lead 14.5 per cent., and zinc 10.5 per cent. The ore reserves opened up have proved almost equal to the quantity of ore extracted during the year, so that the tonnage available stands practically unaltered and amounts to 4,000,000 tons.

The record of the South Broken Hill mine is one of very gratifying progress. The net profit for the half-year amounted to £104,525, and the dividends paid to £80,000. Not only have the financial results been most satisfactory, but developments during the year at the 970-ft. level have resulted in an addition of 1,000,000 tons to the ore reserves, bringing the total up to 3,000,000 tons. The lode at the 970-ft. level has been proved for a length of 1400 ft., having an average width of 100 ft., the assay values being: Lead 13.7 per cent., zinc 11.8 per cent., and silver 7½ oz. The managing director states that fear had been expressed that with depth the value of the orebodies at the south end of the lode would decrease, but in the South mine this had been dispelled by the fact that the ore at the lower level had actually shown an improvement in grade.

It is understood that a settlement has been come to in the matter of the dispute between the Potter Sulphide Company and the Broken Hill Proprietary Company in the matter of alleged infringement of patent in the processes known as the Potter and the Delprat (salt cake) for the recovery of zinc from sulphide ores. The terms of settlement, it is stated, provide that the Broken Hill Proprietary Company pays £10,000 and obtains the right to use the Potter process, while the Potter Company will be allowed to utilize the Delprat pan.

In the last half-yearly report of the Broken Hill Proprietary Company it is stated that the alteration carried out in the direction of deepening the Delprat pans has resulted in an improved concentrate being obtained from the tailings treated, the average grade for the six months being 41.81 per cent. against 40.66 per cent. for the previous period, while more recent trials have brought the grade up to 43 per cent. The Proprietary Company has not so far been able to overcome the difficulty experienced with the spelter plant, although somewhat better results have recently been obtained. The tests carried out by the Zinc Corporation with the Elmore plant are represented as being satisfactory. The additional capital raised will enable this corporation to complete the contracts with the several companies for the purchase of the large quantities of tailings; and the companies on their part have agreed to allow easier terms for payment than stipulated in the original contract. It is a matter for much regret that the operations of this corporation have fallen so far short of expectations.

The Salt Market

It is reported by the *Journal of Commerce* that an understanding has been reached between the International Salt Company, and certain independent manufacturers in regard to regulating the future course of the market for evaporated salt. This action has been taken in consequence of the higher cost of labor and supplies, as well as the overproduction of salt. As a result of this understanding prices have recently been advanced 50c to $1 per ton from the low figures prevailing about a month ago, when sharp price cutting was in progress. Notwithstanding this advance, quotations are still below the top level of last year. Common bulk salt is now quoted at $3.80 @ 4.50 per ton at the point of production. No change has been made in the price of rock salt.

Incidentally a policy of retrenchment has been inaugurated and various concerns have reduced their working forces. As customary at this time of the year the demand for salt shows a falling off, which applies more particularly to rock salt, growing out of the approach of cool weather. The consumption of this grade of salt during the past year assumed high proportions, being about 25 per cent. higher than in the preceding year. However the combined inquiry for crude and evaporated salt during that period was not sufficient to keep pace with the volume of production.

The Sterling Salt Company, one of the most formidable rivals of the International Salt Company, whose output up to within a recent period was about 1,000 tons per day, has made a curtailment of 25 to 30 per cent.

The bucking and snorting and refusal of gas engines to start, says *Power and Transmission*, is due to moisture in the cylinder, preventing regular ignition until dried by the heat of several explosions. The difficulty may be obviated by shutting off the cooling water a few minutes before starting the engine, and not turning it on again until after the engine begins to explode regularly.

The determination of the Bank of Sicily to maintain its rate of advance on certificates of sulphur deposits at only three-fifths of the sulphur value is likely to result in the closing of many mines, as many producers are unable to continue business under present conditions.

Coalite

By S. W. Parr*

A number of articles have recently appeared in the Engineering and Mining Journal under the above title. The material seems to have certain peculiarities of interest, notably its property of burning without producing smoke. The process of manufacture has been developed in England and only meager details seem to be available as to its method of preparation. The facts at hand, however, suggest a certain resemblance to experiments now being carried on at the University of Illinois on coals of the Mississippi valley. These experiments were stimulated in the first instance by the coal famine in the anthracite region, resulting from the labor troubles there five years ago. The attempt was made to duplicate in some fashion the smokeless coals of the eastern United States by artificial processes. While these experiments are by no means completed, enough facts are at hand to afford perhaps some information of sufficient interest to warrant publication, especially in view of the articles now occasionally in print from English sources.

TABLE 1. MODIFICATION OF CHEMICAL STRUCTURE OF COAL.

Preliminary Experiments

	Normal Condition. Per Cent.	After Heating at Approximately 500 Deg. F. One Hour.		After Continuing the Heat to Approximately 1000 Deg. F. Ten Minutes.	
		First Experiment. Per Cent.	Second Experiment. Per Cent.	First Experiment. Per Cent.	Second Experiment. Per Cent.
Moisture	6.49	0.00	0.00	0.00	0.00
Ash	6.69	6.69	6.69	6.69	6.69
Volatile matter	33.27	5.13	12.69	0.00	0.00
Fixed carbon	53.55	72.23	66.45	72.60	69.10
Increase of fixed carbon		34.90	24.00	35.50	29.10
Loss of volatile matter; chiefly non-comb'tible		15.95	14.16	20.71	24.21

TABLE 2. EFFECT OF HEATING IN AN ATMOSPHERE OF PURE NITROGEN.

	1	2	3
Size of coal	100 mesh.	100 mesh.	100 mesh.
Maximum temperature	485 deg.	575 deg.	650 deg.
Time of heating	2 hours.	2 hours.	2 hours.
Loss in volatile matter	10.35 per cent.	15.20 per cent.	18.5 per cent.
Calories in residue	6445	6697	6501
Calories in residue referred to original unit	5764	5675	4797
Calories in original	5870	5870	5870
Loss in calories	1.79 per cent.	3.31 per cent.	18.37 per cent.

Transforming Pulverized Bituminous Coal

The first item developed in this connection was the fact that at a moderate heat, finely pulverized bituminous coal underwent a marked transformation both as to its physical and chemical properties. The percentage of fixed carbon was increased, with a somewhat similar decrease in the per cent. of volatile matter, while the residue had lost completely its coking properties. The temperature at which this change could be affected was approximately 500 deg. F. If now we refer this product for comparison to a common ash unit, we can judge as to what actual change has taken place. In the table below the quantity of ash in the original coal has been taken for such basis of comparison. There are given also the results obtained by carrying this modified material on to a temperature of approximately 1000 deg., or to dull redness.

In making a study of the reactions involved in this change it seems evident that the process is one largely of oxidation. This is suggested indeed by the fact that a thermometer inserted in the crucible containing such finely divided coal, by application of heat from without suddenly develops additional heat from within, thus elevating the mercury for some minutes, after which it drops back to the former temperature. This phenomenon would suggest also that a loss of calorific value had resulted from the process. This would seem to be the case from the following data: Temperature, 500 deg.; loss of volatile matter, 19 per cent.; resulting fixed carbon, 62.6 per cent.; increase of fixed carbon, 18.54 per cent.; indicated calories, 6625; loss in calories referred to original, 9.2 per cent.

These facts naturally suggest a series of experiments in which the atmosphere surrounding the coal is non-oxidizing. By substituting, therefore, pure nitrogen for ordinary air, the results as tabulated above are obtained. It is of interest to note that the decomposition for various coals, while it begins at somewhat varying temperatures, is fairly constant in starting at about 500 deg. and is complete within the range of 500 to 550 deg., the volume of gas given off within that range being also fairly constant. Moreover, the loss of combustible matter up to this point is small, but above 600 deg. the loss is rapid.

Calorific Value of the Product is Increased

In studying the characteristics of the residual product, it is evident that there has been a marked increase in the relative amount of fixed carbon. This feature undoubtedly has much to do with the further fact that the residue burns with an almost complete absence of smoke. Attention should also be called to the fact that the residue shows an absolute calorific value per pound decidedly in advance of the raw coal. It is evident from this that the loss of weight incident to the treatment consists chiefly of the inert volatile constituents of the coal rather than to the combustible matter. Further experiments were conducted upon samples not so finely ground to discover if fineness of division was an essential element of the case. Buckwheat size gave substantially the same results in the atmosphere of nitrogen, but as might be expected, behaved quite differently in the ordinary atmospheric medium. The fineness of division, with the attending property no doubt of promoting catalytic action, resulted in oxidation of volatile matter which was entirely absent in the coarser form. Altogether, these results are highly suggestive along lines looking to a better understanding of spontaneous combustion, as well as to the artificial production, from the exceedingly smoky coals of the middle west, of a fuel practically free from this feature and at a loss of fuel value which in itself may be made to largely accomplish the work, considering the low energy required in bringing it about. Experiments on a more extended scale are now being conducted to determine more definitely the character of the distillates, as well as the residual material and to afford some basis for determining the commercial and industrial possibilities of the process.

As the accuracy with which drill bits are formed and sharpened has a great influence on the capacity of a rock drill, and also as the maintenance of drill steel is one of the most important items in the cost of rock drilling, experience has shown that all mines using a considerable number of drills should include one or more drill-sharpening machines in its equipment. Drills sharpened by machinery are more perfect than those done by hand, and the saving in cost will in a short time pay for the machine. The saving in labor alone is estimated as amounting to at least 65 per cent.

An important item to consider in installing a machine mining plant is the amount of power required to cut a given amount of coal. It is almost impossible to determine accurately the amount of power used by air-pick machines in cutting a foot of coal because of pipe-line leakages, use of air for other purposes, fluctuation in steam and air pressure, etc., but electric machines can be fitted out with portable instruments which register accurately the quantity of power consumed, and by this means the operator can tell just how much power each type of machine uses in cutting a given amount of coal.

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Minerals at the Jamestown Exposition

The States, Especially Those of the South, Are Represented by Comprehensive Exhibits of Minerals and Mineral Products

BY JOSEPH STRUTHERS*

The following description of the exhibits grouped in the Department of Mines and Metallurgy of the Jamestown Exposition is necessarily brief, comprising only those of special interest on account of excellence of presentation or of novelty of design or application.

To be fair in judgment, it should be borne in mind at the outset that the Jamestown exposition is not on as grand a scale as the great fairs held at Chicago and St. Louis, lacking, as it does, the wide scope afforded by international coöperation; yet it possesses many worthy features and affords a better insight into the mineral resources of the Southern States than has heretofore been publicly obtainable.

FIG. 1. NORTH CAROLINA EXHIBIT, JAMESTOWN EXPOSITION, VIRGINIA

Among the features which render the Jamestown fair especially attractive is the novel electric illumination of the auditorium building, shown in the photographic view, Fig. 2. Broad beams of light from eight powerful search-lights are projected far into space, producing an aurora effect that is strikingly beautiful.

The division of mines and metallurgy is under the direct charge of Dr. Joseph Hyde Pratt, State geologist of North Carolina, to whose energy and untiring zeal is largely due the success of the installation and administration of the department. Dr. Pratt has been ably assisted in his work by James F. Dorsey, superintendent of the building. Headquarters for members and guests of the American Institute of Mining Engineers have been established at the south entrance of the Mines building, under the charge of Dr. Pratt. Conveniences for writing and posting letters have been provided and arrangements have been made for prompt delivery of mail matter if addressed in care of Dr. Joseph Hyde Pratt, Mines building, Jamestown exposition, Virginia.

Mineral Exhibits

The chief exhibits relating to mining are in the Mines and Metallurgy building, although there are several other complete and interesting collections of ores and mineral products in the States Exhibit building (especially those of New Jersey, Tennessee and California), either under the name of the State or included in the collective exhibit of railroads not classified by States.

The mines and metallurgy building is practically divided by an interior courtyard into two sections, connected at one side by a spacious passageway, which is also utilized for showing the exhibits. The north section is devoted solely to the exhibits of Virginia, and the south to those of all other States excepting New Jersey, Tennessee and California, as mentioned above.

The States exhibiting in the Mines building are: Ohio, Georgia, Kentucky, Vermont, North Carolina, Michigan, Maryland and Virginia.

Ohio calls special attention to ceramics, pottery, brick and tile, and presents one of the most complete and elaborate collections of these wares made in the State yet placed on exhibition. The samples

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were collected and arranged, under the direction of Prof. J. A. Bownocker, State geologist of Ohio, by Arthur L. Smith, who is in charge at the building. The pottery products are of sufficient number and variety to illustrate fully this important industry. Some of the Rookwood decorations are of exquisite design, and compare favorably with those of foreign manufacture. The brick industry is instructively represented by 40 or more panels, each about 2 ft. square, of various kinds of brick, built around the walls of the space. Each panel has a distinctive label showing the name of the special brick and its field of use—an excellent arrangement which affords ready means of comparing colors and textures. The exhibit also includes sandstones, building-stones, limestone, cement rock, salt, molding-sand, etc.

Georgia, Kentucky and Vermont

Georgia is represented by a general collection of minerals and a special collection of economic minerals. These collections, prepared by W. S. Yeates, State geologist, are under the charge of S. P. Jones, and will be returned to the State museum at Atlanta after the close of the exposition. The specimens, varying in size from minute crystals to immense slabs, occupy many cabinets, and are so arranged that a critical examination can be made with ease. Of special interest is a small case containing native gold in grains and nuggets, and a collection of gems gathered in the State. The mineral resources are further illustrated by large slabs of cut and polished colored marbles, displayed around the walls. A number of rounded columns of white or gray marble placed in front of the cabinets, give to the entire exhibit a pleasing and finished effect.

Kentucky contributes a collection of minerals and mineral products contained in flat cases extending along the east side of the building. This exhibit was installed without the aid of the State by the Kentucky-Jamestown Exposition Commission, to the members of which special credit is due for their commonwealth pride. A great part of it was furnished by the Kentucky Geological Survey, through Director C. J. Norwood. There are also many specimens of coal, oil, iron ores, clays, asphaltum, etc., arranged somewhat irregularly, yet conveying information which can be extracted with a little effort. The coal and oil exhibits are especially good.

Vermont shows a varied collection of building stones. Marble and granite, polished and uncut, are displayed attractively near the entrance from the interior court.

Michigan and North Carolina

Michigan, the State of grand possibilities for a mineral and metallurgical display, presents several cabinets of iron ores and copper ores of the Lake Superior region with associated minerals; immense specimens of sheet and mass copper mineral of odd fantastic shapes; a stand of copper products, comprising ingots, wire-bar, slabs and finished wire; and an interesting collection of different sizes of reversible propellers of bronze. H. E. Sargent was instrumental in establishing and collecting this exhibit. The minerals in cabinets, lent by the Kent Scientific Museum, add materially to the educational value of the exhibit and contribute largely to the general effect of the installation. There is also a glass plate model of the Oliver iron mine.

North Carolina occupies the central court at the east end of the building. The collection and installation of this fine exhibit has been in charge of Dr. Joseph Hyde Pratt, who deserves special mention for the taste displayed in installing the many specimens. A general view of this exhibit is shown in Fig. 1. Two large archways of granite face the corner entrances of the buildings, and, leading from these archways, are balustrades of white granite from Mt. Airy and pink granite from Salisbury, which surround the space allotted. The building stones are also represented by columns and spheres, cut and polished in different ways in order to show the character of the stone. The excellent collection of gems, furnished by Dr. Pratt, the American Gem and Pearl Company, New York, and the State museum, represents fully the gems and gem minerals occurring in the State. Of special interest are the specimens of rhodolite and hiddenite, varieties which have been found in North Carolina only. The mica and talc industries are comprehensively represented by crude, intermediate and finished products arranged so as to illustrate the various steps in the manufacture of the materials into commercial products. The Sylva Mica Company, the North Carolina Talc and Mining Company, the American Lava Company, the Talcum Puff Company, and the Croatin Company coöperated in furnishing the specimens exhibited. The monazite industry is attractively exhibited by a 5-ft. vertical section of a deposit of gravel, inclosed in a box having a glass front, and jars containing corresponding quantities of crude and concentrated products extracted from the crude gravel, thus illustrating the working of the deposit. The use of the salts of the rare elements obtained from monazite is represented by a display of incandescent mantles. (See also the description of the exhibit of the Welsbach Light Company, mentioned later in this article.)

Coal from West Virginia

West Virginia is well represented by exhibits of the Pocahontas Coal Association, the Davis Colliery Company, the New River Company, and Castner, Currin & Bullitt, collected and arranged by F. R. Wadleigh. This exhibit is illustrated in Fig. 3 and shows large blocks of coal representing original sections of the coal bed up to 10 ft. in thickness; a model of a colliery; samples of market coals and coke; photographs of various branches of the industry, coke ovens, shipping points; etc. The coal industry of the State is also illustrated by a lofty column of coal near the water front, 16 ft. square at the base, 12 ft. square at the top, and 123 ft. in hight, representing the collective average thicknesses of 19 coal seams now being mined commercially in the State.

Nova Scotia

Nova Scotia, the one country beyond the borders of the United States which sent a mineral exhibit, displays a collection of representative minerals, the gold ores being of special merit. Mr. Henry Purs is in charge of this creditable display..

Resources of Virginia

Virginia is represented in a manner of installation differing from that of other States in that it occupies entirely a separate section of the Mines and Metallurgy building. The exhibits are attractive, especially from a popular view-point, on account of their large scale; full-sized coal cutters, sections of coal beds and adits, mine cars and similar apparatus lend a businesslike air to the installation. The collection of exhibits was made under the auspices of the Virginia Mineral and Timber Exhibit Association, organized by representatives of the leading mineral and timber interests in the State. The officers of this association are, president, C. A. Swanson; vice-president, R. A. Ayers; treasurer, W. W. Baker; and secretary, B. C. Banks. To the last-named is chiefly due the collection and installation of this extensive and interesting exhibit.

The work of Mr. Banks has been supplemented by that of Dr. E. U. Schubert who is in charge of the exhibit of the Norfolk & Western railroad, also included in this section. The exhibits have been grouped collectively, so that no one class detracts from another. In the center of the building, surrounding a raised pavilion, used as a reception room, are grouped the general State exhibits, comprising iron ores in great variety and profusion from operative mines and from prospects, (of special note are two immense lumps of "pipe-ore" limonite weighing many hundred pounds each) manganese ores, abrasives, clays, building stones, etc.

Around the sides of the building are installed the exhibits of railroads and companies. The Norfolk & Western railroad display is extensive and excellent, including a complete suite of zinc ores and products from the Bertha Mineral Company and instructive models of the mine and reduction furnace. Pulaski county is represented by four varieties of building stones built into large arches, and an instructive set of products of the Pulaski Iron Com-

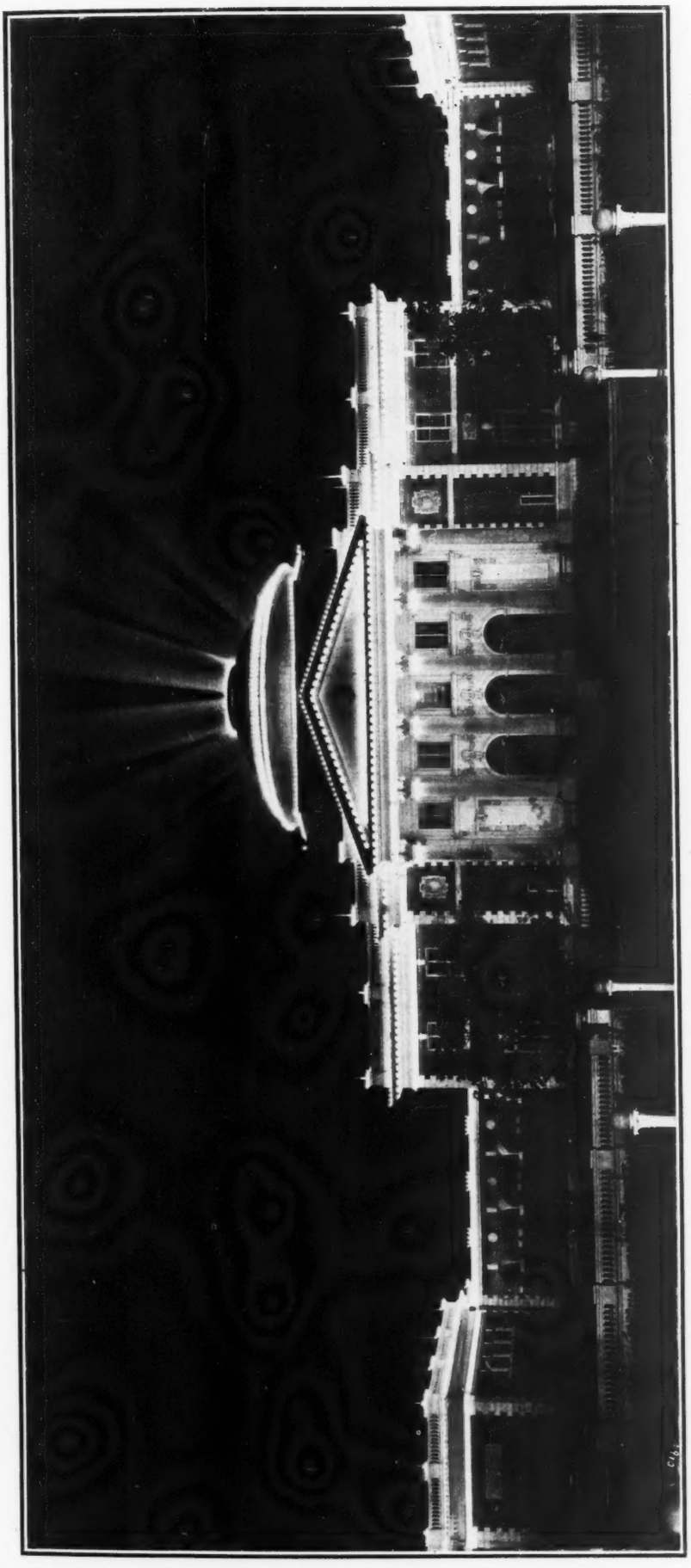

FIG. 2. ELECTRIC ILLUMINATION OF THE AUDITORIUM BUILDING, JAMESTOWN EXPOSITION

pany. The coal exhibit of the Pocahontas Collieries Company is most complete, including a section of the Pocahontas vein weighing 7½ tons. An instructive exhibit is that of the Southern Gypsum Company, which includes a 3-in. core, obtained by the Davis calyx drill, representing the thickness and quality of the deposit. Another exhibit of popular interest is a 6-ft. model of the Merrimac, made of anthracite coal from the mines of the Virginia Anthracite Coal and Railway Company in Montgomery county.

Other exhibits of coal and coal products have been obtained from various companies, each valuable to the coal specialist but not of sufficient general interest to warrant a separate description. Among these companies are: Virginia Iron, Coal and Coke Company, Stonega Coal and Coke Company, Colonial Coal and Coke Company, Imboden Coal and Coke Company, Tazewell Coal Land Company, Blackwood Coal and Coke Company, Black Mt. Coal and Coke Company, Clinchfield Coal Corporation, Jackson Coal and Coke Company, Chesapeake & Ohio Railroad.

Other minerals exhibited are: copper ores, asbestos, slate, soapstone, pyrite (Louisa county), plaster (Buena Vista Plaster and Mining Company), cement, onyx and marble (Southern Railway exhibit). In addition to the mineral exhibits in the building are several fine displays of timber, in rough and finished products, among the latter being an excellent collection of hollow wooden columns surmounted with wooden caps, painted with white enamel, that attract much attention on account of the close resemblance to marble.

New Jersey, Tennessee, California, Etc.

The exhibits of New Jersey, Tennessee and California (San Diego county) are shown in the States building, a short distance from the Mines building. New Jersey has contributed, through the cooperation of Dr. H. B. Kümmel, State geologist, and his assistant, R. S. Morse, an admirable collection of minerals and mineral products from the State museum at Trenton. The specimens are attractively arranged in special cases, having in view the educational standpoint. The description on each label has been carefully thought out, and a view of a single cabinet is an illustrated lecture in itself. Particular interest, of course, is attached to the minerals collected from the famous Franklin mine.

Tennessee marbles, most beautiful in color and design, are tastefully arranged in the exhibit of the Southern railway. The slabs form the supporting shelf, on which are placed the cabinets filled with specimens of iron, copper, gold, silver, zinc and lead ores, granite, talc, and other products obtained from points in the Southern States adjacent to the railroad. The Chesapeake & Ohio railroad also had

a similar collective exhibit in this building.

A wonderful collection of gems and precious stones from San Diego county, California, is exhibited under the supervision of James A. Jasper. This collection, attractively displayed in a special cabinet, rivals, and in some respects even excels, that of Tiffany & Co. in the Mines building.

The exhibit from Maryland consisted chiefly of a number of relief maps of the State, and the publications of its State geological survey, obtained through the cooperation of William B. Clark, State geologist, of Maryland.

At the southeast entrance to the Mines Building is a 5-ft. statue of "Lot's wife" carved from a solid block of rock salt obtained from the salt mines in Louisiana. Surrounding the pedestal supporting this popular exhibit are placed a number of samples of the commercial product. In the States Building the exhibit includes a collection of photographs representing the method of pumping sulphur in a molten condition from the deposits, also a large pyramid of the partly refined product as it is obtained after solidification in the tanks. The petroleum industry is represented by a number of specimens of crude and refined products. There is a large and interesting bas relief map of the coast of Louisiana, colored according to the various geological periods represented, and a small geological relief map of the Island of Petit Anse.

Gems and Rare Minerals

Apart from the exhibits classified by States, there are a number grouped under this head, of which the following are of special interest and merit:

In the center portion of the Mines and Metallurgy building, the firm of Tiffany & Co. has made a beautiful display of gems and semi-precious stones that equals or even surpasses the exhibits by this firm at former expositions. Aside from the artistic attractiveness, the exhibit is valuable educationally, in that both cut and uncut specimens are represented, and in some instances the crude stone is shown in the natural state associated with the gangue rock. Specimens are also exhibited to illustrate the various styles of cutting in order to bring out the color and brilliancy to the best advantage.

The Arizona turquoise exhibit represents the product of a new mine recently opened in that State. The specimens are of good color and are shown in the rough, as clear turquoise and turquoise matrix.

Platinum is well illustrated by the exhibits of Baker & Co. and the S. S. White Dental Company, which show the occurrence of the platinum, platinum grains and nuggets, associated metals and minerals of platinum, various salts made from platinum, and products manufactured from this metal. This collection is one of the most, if not the most, complete platinum exhibit ever shown at an exposition.

The radium exhibit, one of the attractive features of the Mines building, has been brought together by Dr. George F. Kunz, Prof. Truman Abbe, Dr. Metzenbaum and Dr. Robert Abbe. This exhibit includes minerals that are radioactive and salts made from these minerals. It also illustrates the use of radium in medicine in presenting by photographs, radiographs, models, etc., the results of various experiments with this remarkable element.

Adjoining the radium exhibit is that of oxzone, manufactured by the Roessler & Hasslacher Chemical Company. Oxone is a preparation of fused sodium peroxide, which has the property of liberating oxygen gas upon contact with water. So avid is this compound for water that it will react with the moisture contained in ordinary air, forming nascent oxygen and sodium hydrate. This special property is of interest to mine operators in that vitiated air can be rejuvenated automatically by the generation of nascent oxygen and the absorption of carbon dioxide by

FIG. 3. WEST VIRGINIA EXHIBIT, JAMESTOWN EXPOSITION

the sodium hydrate produced. The company has a small oxygen generator which should be of value for use in gassy mines, or in badly ventilated places.

The exhibit of the Welsbach Light Company contains specimens to illustrate the occurrence of thorium minerals, the various salts manufactured from the crude product, and finally the incandescent mantles used for illumination. Specimens of monazite, with associated minerals and various salts obtained in separating the thoria from this mineral are also instructively exhibited. In connection with this exhibit Dr. Henry S. Minor should receive special commendation.

Aluminum and Steel-hardening Metals

The aluminum exhibit, by the Aluminum Company of America, occupies a prominent place near the center of the building. It is comprehensive in its presentation, and is most attractively installed. Specimens of crude bauxite, from which the metal is derived, are shown; aluminum oxide, which is the first step in the process of reduction of the ore; and finally, various forms of pig aluminum, used in the manufacture of various aluminum articles. One of the most attractive features of the exhibit is the collection of specimens that illustrate the manufacture of various utensils from the metal. First is shown a round sheet of metallic aluminum, representing the initial stage in the manufacture of a tea-pot, canteen or other utensil; then similar pieces, spun or otherwise, worked up into the different stages until the finished article is reached. Of popular attraction is the metal chain surrounding the show space, which appears very heavy, but being made of aluminum can be raised or moved aside with great ease.

The interesting group of steel-hardening metals is represented by exhibits brought together by the Primos Chemical Company, of Primos, Penn.; Eimer & Amend, of New York; the American Rutile Company, of Washington, D. C.; and the Manganese Steel Safe Company, of New York. In this exhibit, the crude ores of manganese, chromium, tungsten, etc., are shown; the concentrates of these ores and various ferro-alloys, manufactured and made from them. A burglar-proof safe of manganese steel is also on exhibition.

Abrasives and Other Products

Under this head are shown all abrasives of practical application now used in the arts. This exhibit has been made possible by the hearty coöperation of the Pike Manufacturing Company, which contributed whetstones, oilstones and corundum wheels; the Norton Company, crude alundum and the various wheels and stones manufactured from it; the Carborundum Company, crude and crystal carborundum and various wheels and stones; the Cleveland Stone Company, mounted and unmounted grindstones; Irvin Reifsnyder, millstones from Pennsylvania; J. A. Wright, of Keene, N. H., samples of infusorial earth used in the manufacture of silver polishes; the Highland Forest Company and the American Garnet Company, garnet; and Joseph Hyde Pratt, specimens of corundum from all over the world, and a collective exhibit of all kinds of abrasives. The entire collection is excellent in arrangement and instructive value.

The Standard Oil Company has made an elaborate exhibit which compares favorably with others that have been made by this company at former expositions. This collection includes various crude and refined oils, candles, photographs and models, and an oil-well derrick. The Oil Well Supply Company exhibits a large wooden model of an oil-derrick.

The cement industry is represented by exhibits of the American Cement Company, Lehigh Portland Cement Company, Universal Portland Cement Company, and Sandusky Portland Cement Company. These specimens illustrate the manufacture of cement, giving the various raw materials and the finished products. There is also a general collection of cement materials, literature, etc., admirably arranged for instructive study by E. C. Eckel, Washington, D. C.

The glass sand industry is illustrated by the comprehensive exhibit of Ernest F. Burchard, of the U. S. Geological Survey, Washington, D. C.

An instructive exhibit of peat and peat products, domestic and foreign, together with literature on this industry, is placed in the Mines building, and all interested in this subject will be pleased to know that there will be a meeting at the Exposition, Oct. 23 to 26, of the newly formed American Peat Association. The officers of this organization are: Chairman, Dr. Joseph Hyde Pratt; secretary and treasurer, Julius Bordollo, Kingsbridge, N. Y.

The literature of mining and metallurgy is represented by a number of publications shown near the south entrance of the building.

Model of Gold Mine

A working model of a gold mine, formerly shown at the St. Louis exposition, is one of the concessions in the Mines building. A small fee is charged for admission, the model in miniature is arranged to illustrate the principal stages in operating a gold mine, sinking shafts, driving levels, winzes, methods of stoping, etc. James T. Haywood gives a popular lecture at stated times. There is also on the "War Path" a scenic representation of the Klondike region, which includes an actual exhibit of the method of treating placer gravel. The material is hoisted from a shallow shaft, washed in a sluice, and the gold(?) nuggets finally obtained are passed around the audience for inspection. The conditions of living during the winter in the far North are well described by Capt. Eli A. Smith, who exhibits his famous dog team.

Calumet & Arizona Mining Company

Special Correspondence

The following data concerning the operations of Calumet & Arizona Mining Company have recently been reported: Total dividends paid to date, per share, $45, as follows, beginning Dec. 21, 1903, and continuing quarterly thereafter, first $1.50 and 50c., three of $1.50, four of $2, two of $2.50, one of $3, one of $3.50, one of $4 and three of $5. The results of the operations of these years are shown in the accompanying table.

Year.	Net Earnings.	Lb. Copper Produced.	Average Price.	Produced Precious Metals	Gross Product.
1904	$1,682,518.39	31,638,660	12.562c.	$195,926.18	$4,170,374.65
1905	2,314,268.48	31,772,896	14.932c.	178,843.58	4,923,172.41
1906	4,827,872.50	37,470,284	17.960c.	238,464.12	6,968,127.13

The costs per annum were: 1904, 7.86c. per lb.; 1905, 8.21c.; 1906, 5.71c. These costs include every item of machinery purchase, of smelter addition, and all development during the periods under review. Probably at least $1,000,000 have been put into smelter enlargements and machinery at the mine during this period. L. W. Powell, formerly assistant to the president of the Oliver Iron Mining Company, of Duluth, has been in charge of this mine since Feb. 1, 1906.

Special Tool Steels

By Gordon C. Mills

In tempering modern special tool steels very high temperatures are necessary. Also great caution has to be used to prevent contact of air or carbon, as otherwise the composition of the alloy would be liable to change, with very harmful results.

The Körting electric tempering furnace is a new type especially adapted for this purpose, the feature being that the steel is heated in a bath of some fused salt, such as barium chloride, by means of a powerful electric current. An exceedingly steady temperature of 1300 deg. C. can be easily maintained for hours.

Arrangements for Handling Coal Output

Simple and Efficient Mechanical Methods Adopted for Handling Coal at Mines under Various Conditions. Unique Car Devices

BY FLOYD W. PARSONS

The successful operation of a coal mine depends more upon the use of economical methods in handling the output than on any other feature of development. Conditions at the various properties are so diverse that it has been found necessary to devise numerous systems. The limiting factor in the arrangement of the loaded and empty tracks at the surface and bottom of a shaft or slope, is the lack of ground space available. Modern practice requires that few men be employed to handle the loaded and empty cars in their transit to the breaker or tipple, the general scheme being to have the loaded cars run away by gravity, and after being dumped, attain through mechanical means, an elevation sufficient to cause them to return to the shaft or to the parting underground by gravity.

In many instances the shaft is located near the boundary of the property, and when the required barrier pillar protecting the workings is left, but little space remains to utilize in handling the cars.

The Transfer Truck

One method for handling loaded and empty cars at the head of a shaft is that which employs a system of tracks with a transfer truck. This scheme has been used with success at several anthracite mines, and, although not generally adopted, is especially useful under certain conditions.

The general plan of tracks for this system is shown in Fig. 10, while Fig. 2 illustrates the design of the mine-car transfer truck. This method of operation is simple in its arrangement, and has several advantages. One man is necessary to move the transfer truck back and forth, but the track having a grade of 1 per cent. favoring the load makes this work easy. It is necessary because of this grade given the transfer track, to have the rail nearest the empty track of a greater pitch than each of the rails further away. As in Fig. 10, the upper rail has a grade of 4 per cent., while the lower rail is laid on a 3 per cent. grade.

The most important part of the transfer truck arrangement is the system of safety levers, which are provided to prevent any accident in transferring the empty cars. The detailed arrangement of these levers is shown in Fig. 7, and is so designed that blocks *A* and *B* prevent the empty car from leaving the transfer truck until the cage is at a standstill in the proper position to receive the cars. By operating block *C*, the truck may be pushed to the end of the track and the empty car loaded on the far cage.

The transfer truck system of handling loaded and empty cars can be satisfactorily employed both underground and at the surface, and its use under certain conditions is attended with much economy. In case there are two or more hoisting compartments to a shaft, the transfer truck is sometimes utilized to place the loaded cars on the cages that hoist successively.

A Successful Chain Hoist

An uncommon method for returning empty cars to the underground parting, is that shown in Fig. 3. This system is especially useful in an underground operation where the empty cars have to be returned to the same side of the shaft that the loads are run in on. At numerous plants a modification of this style of hoist is used, the general plan being to have the cars hoisted up a short incline where they are dropped over a knuckle and after running down a short incline, they utilize the momentum gained in this way to ascend another short plane with such velocity as to strike a spring block, which causes them to rebound and after traveling through a spring switch, they continue on to the main parting.

The scheme shown in Fig. 3 is a quicker method and requires less space. The general plan is to have the empty cars run off the shaft down a grade into a swag where the axle of the car is engaged by a dog fastened to a chain carried over two sprockets and driven by a small engine. The ascending angle at which the chains are placed is slightly less than the grade of the incline. This causes the dog which has engaged the axle on the car to gradually slip down until at a point

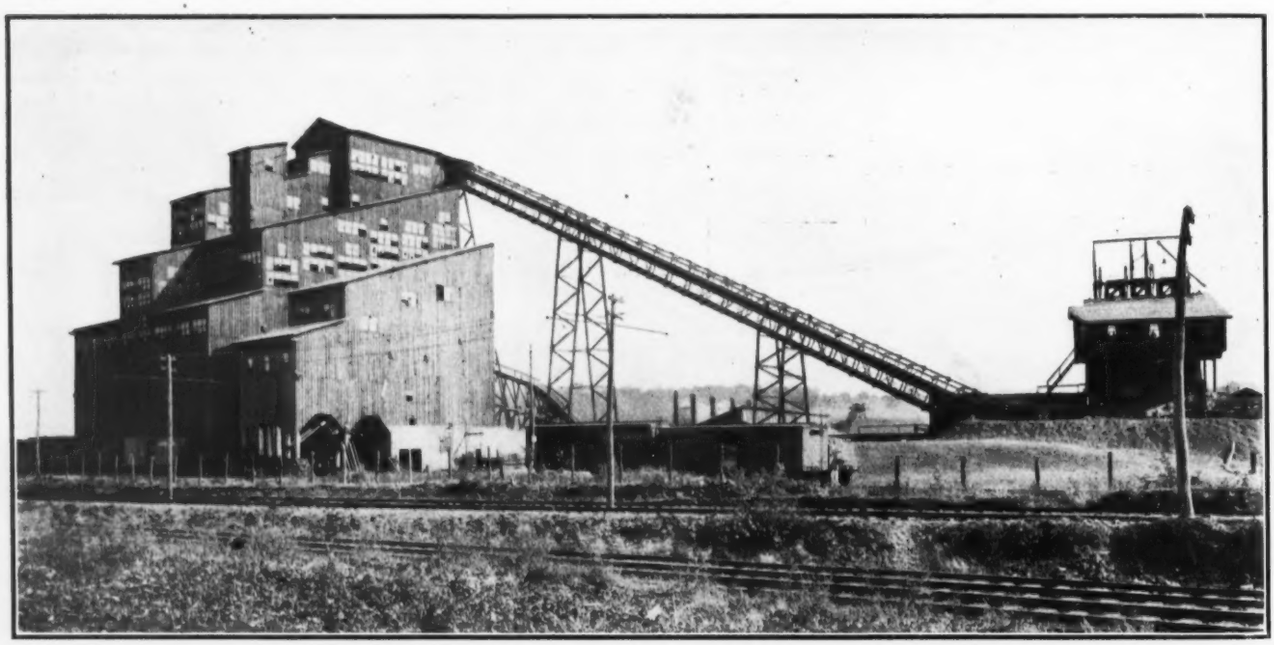

FIG. 1. GENERAL VIEW OF PENNSYLVANIA NO. 14 BREAKER AND STEEL BRIDGE CARRYING LINK-BELT CONVEYER

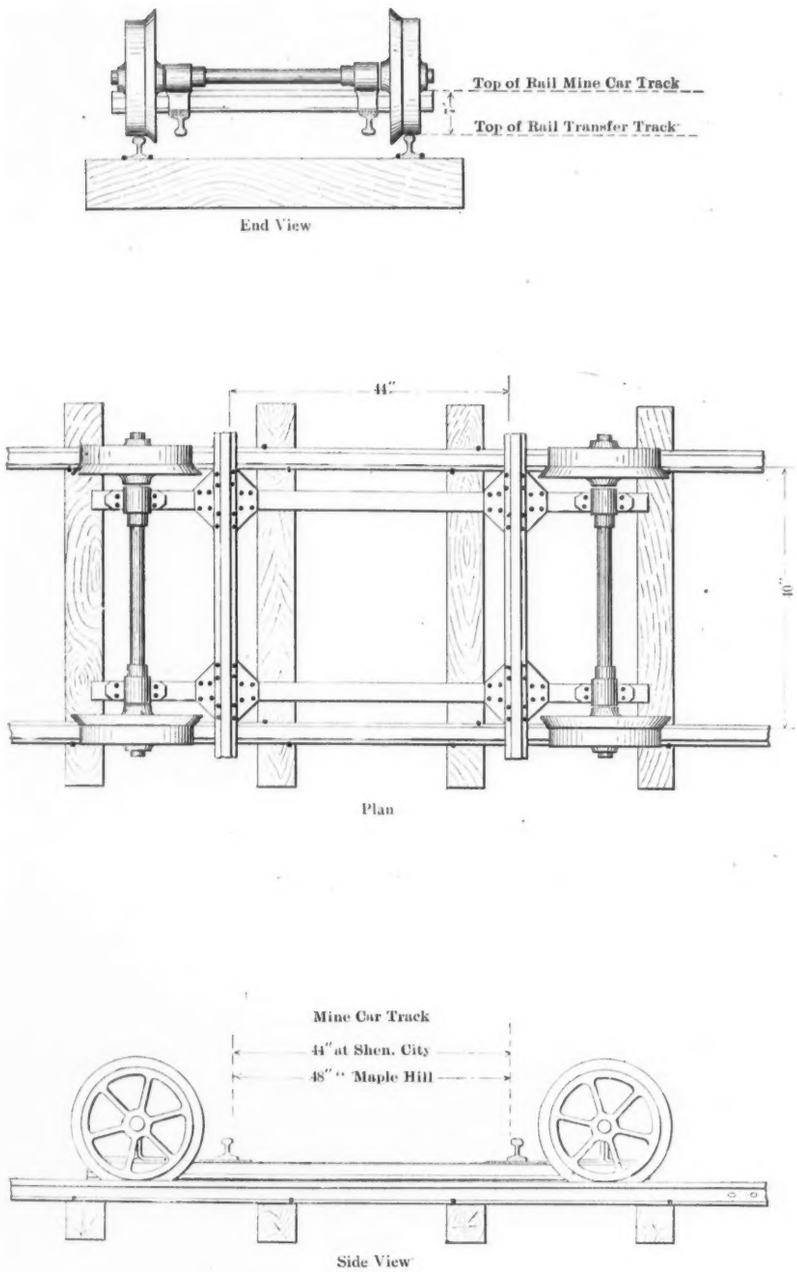

FIG. 2. MINE CAR TRANSFER TRUCK

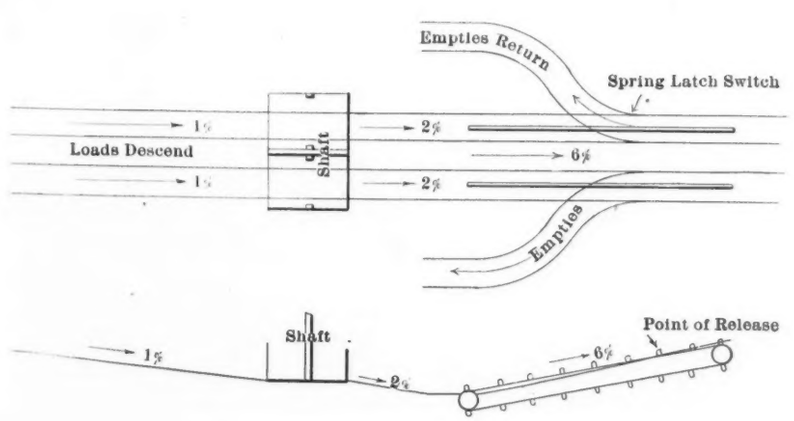

FIG. 3. METHOD OF RETURNING EMPTY CARS

near the top of the plane, the dog entirely disengages the axle and allows the car to descend quickly through a spring-latch switch and travel back to the parting over the empty track.

The principal feature that must be carefully observed when installing an arrangement of this kind is to see that the angle of the chain is such that the dog will always disengage the axle of the car at the same place. It is also necessary that the sprocket chain be flat and that the dogs on the chain are placed at such intervals that the car when released will strike neither the chain nor any of the dogs. The return rails are so cut that the chain moves through this slot and does not engage the wheels of the car.

Self-acting Inclined Planes

In many districts, such as the New River and Kentucky fields, the coal-beds lie at such an elevation above the railway tracks that self-acting planes are used for lowering the coal to the tipple. Fig. 4 shows a typical plane of this kind located in the New River field in West Virginia. In this locality, the coal seams often lie from 1000 to 1500 ft. above the river.

The cost of building an inclined plane capable of handling 1000 or more tons per day varies according to the amount of cutting and trestling that are necessary. The general equipment, however, is not expensive, as the essential parts are a drum fitted with a strong band brake and carrying a heavy cable for lowering the trips. The rollers used on the incline for overcoming friction and wear on the rope are usually made of gumwood, although in some instances steel rollers are used. The plane, as its name suggests, is self-acting and works on the principle that the loaded cars descending will pull the empties up from the bottom. In many instances, large steel bullet-shaped cars are used; these monitors, as they are called, generally hold from 9 to 15 tons and are loaded from a chute or bin at the top of the plane. At some mines it is the practice to send down two or more loaded cars pulling up the same number of empties; the advantages of this latter method are based on the fact that the coal is not transferred or unloaded from the time it leaves the face of the chamber until it is dumped into the railway cars, thus eliminating much breakage, which is an important item in mining and selling bituminous coal.

Flexible-cable Car Haul

Another system of handling a coal output used in many districts is the flexible-cable car haul, which is specially designed for mines where the coal beds lie at some distance below the tipple. At the Beckley Coal Company's plant in Raleigh county, West Virginia, a cable haul of this kind is installed.

The chain car haul still has its strong points for short-distance haulage; but the wire-cable haul, as illustrated at this plant,

is more flexible and is best adapted where the length of haul is greater. At the Beckley plant the distance from the gathering point in the mine to the tipple is 450 ft. In this operation a single steel cable is used, which passes over an adjustable cable wheel in the mine, while at the tipple it operates over two sheaves, connecting with a third located immediately underneath, which is set at right angles. These cable wheels are made with pockets which receive the special cable attachment and carriers, which are guided over, down and around the lower wheel, which acts as the main drive to the whole system. The car haul here installed is designed for a capacity of 2500 tons in 10 hours.

The cost of the wire rope equipment was approximately $2500, while the entire installation represents a cost of nearly $6000.

Bucket Conveyers

Perhaps the most modern method for handling a large coal production is that shown in Fig. 5. At this plant, the coal is hoisted and immediately dumped into a chute from which it feeds into a long bucket conveyer. This conveyer, as shown in the illustration, carries the coal to the top of the breaker, from which point it follows the general process of crushing, jigging and screening. Figs. 6 and 1 show similar arrangements at the Pennsylvania No. 14 breaker near Wilkes-Barre, Penn. Fig. 6 shows the conveyer in detail, while Fig. 1 gives a view of the entire plant.

This type of conveyer, with its regular delivery and large capacity, is recognized as an economical and satisfactory machine for this kind of work. The carrier is 357 ft. center to center and runs at an angle of 25 deg. It is supported by a steel bridge extending from the tipple to the top of the breaker, and has a capacity of 500 tons run-of-mine coal per hour.

The coal is delivered from the tipple to weighing hoppers, then fed by two reciprocating feeders to the buckets. The buckets are 24-in. pitch by 48-in. long, overlapping and continuous, they are riveted to steel-strap chains which have case-hardened steel pins turning in steel bushings. These bushings are fitted with a driving collar, which engages with the teeth of the sprocket wheels. The chains are supported on inclined carrying-rollers, running on T rails. These rollers are placed in the center of links so that there is no sprocket contact, but solely a support for the buckets. Rollers are easily removed without disconnecting the chains.

The power for driving this conveyer is supplied by the main breaker engine, and the machine requires the attention of only three men, one for oiling and general supervision, one for weighing and delivering to the conveyer at foot of tipple, and one to trip the cars.

The Woodward Mine

In locating an anthracite breaker, there

FIG. 4. GRAVITY PLANE AT NUTTALLBURG, WEST VIRGINIA

FIG. 5. SURFACE ARRANGEMENT AT TRUESDALE BREAKER

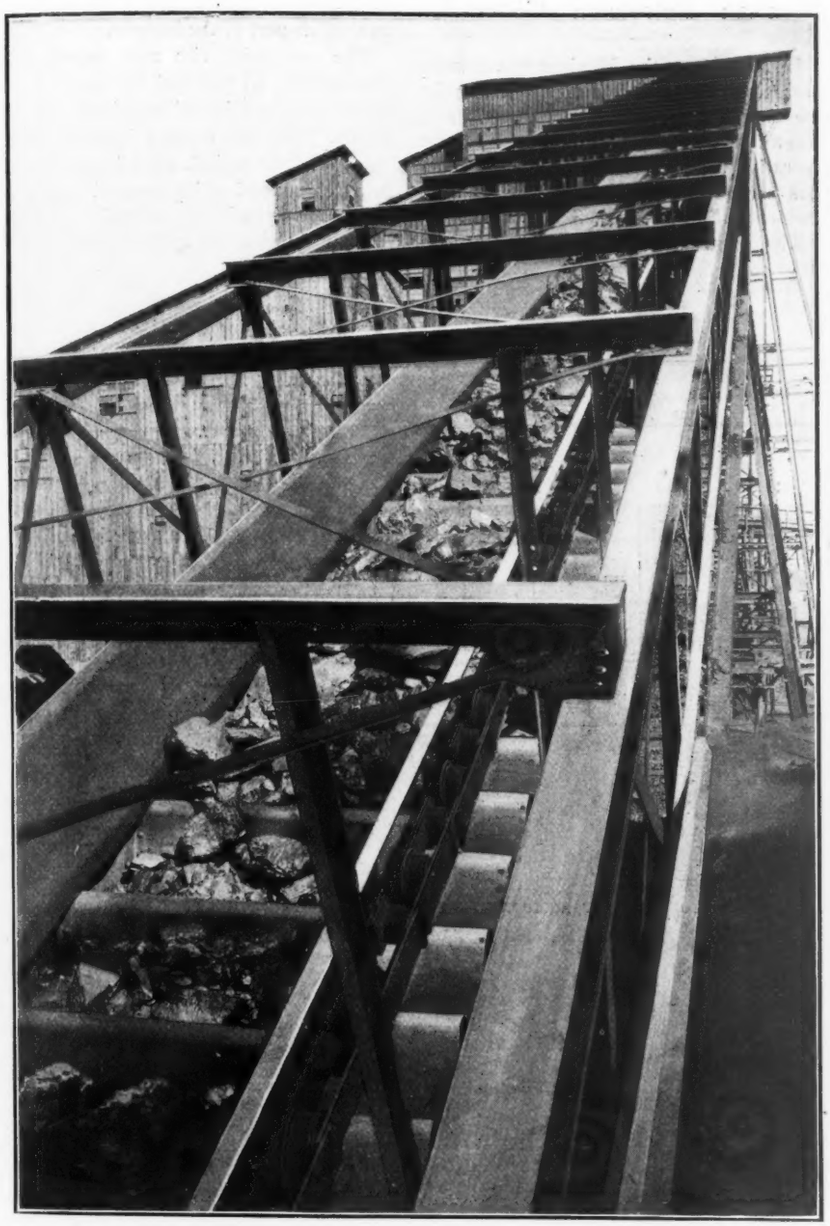

FIG. 6. CARRYING-RUN OF CONVEYER AT PENNSYLVANIA NO. 14 COLLIERY

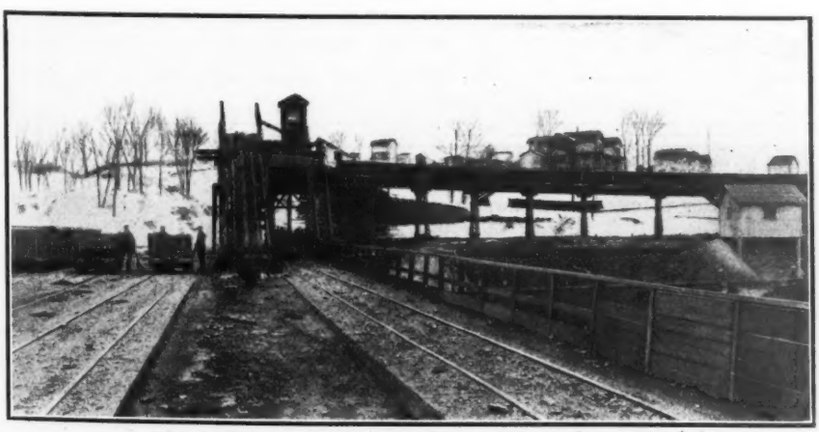

FIG. 8. SURFACE ARRANGEMENT AT WOODWARD MINE OF DELAWARE, LACKAWANNA AND WESTERN COAL COMPANY

are many conditions that must be considered; the culm and waste must be disposed of without any considerable expense, the coal must be first dumped at the top of the breaker, and the final chutes must be so located that the finished product will unload immediately into the railroad cars. At the Woodward mine of the Delaware, Lackawanna & Western Company, near Kingston, Penn., advantage has been taken of the natural topography of the ground to locate the breaker at such a point that the output can be economically handled. In Fig. 8, a part of this general haulage system is shown. To the right of the picture the shaft is located, and from here the loaded cars run by gravity along the tracks shown under the trestle, and on to the breaker, where the coal is dumped. The straight approach shown in the illustration leads directly to the top of the breaker, which latter is located on the side of a steep hill. After the cars are dumped they run again by gravity underneath the approach here shown, and are hoisted by the steep chain hoist shown near the center of the illustration. At the top of this hoist, near the small watch house, the empty cars are released and run over the trestle back to the shaft. A string of empty cars is shown on the trestle in the illustration.

An Automatic Empty-car Lift

The problem of handling empty cars at the foot of a shaft is claimed to be solved by Robert Holmes, of Danville, Ill., who has patented and is manufacturing an automatic empty-car lift capable of handling from 8 to 16 cars per minute. These machines are simple, entirely automatic and require little attention. They take care of the empty cars in a systematic and economical way, dispensing with men and doing the work efficiently.

At the mine bottom the empty car is pushed off the cage by a loaded one and runs down a slight grade for about 25 ft. to the machine, tripping a lever which admits steam or air to the cylinder. The car is immediately hoisted to the elevation necessary, so that by gravity it may travel to a point convenient for the driver or motor. Another lever is tripped by the car as it leaves, releasing the pressure, and instantly the machine is in position for the next car. After leaving the lift the car travels downgrade for about 30 ft., then up an incline, stops, runs back and is switched off to the right or left entry, and continues by gravitation to the point desired.

Each machine is so constructed that the hight of lift may be varied within certain limits, thereby assuring perfect action and proper speed to the car.

One of these automatic lifts, shown in Figs. 9 and 10, is designed for mines which require a net lift above the cage rail of from 3 to 5 ft. The No. 2 machine is built for mines requiring from 5 to 7 ft.

Some mine operators do not care to depend entirely upon one machine, and when desired both of these machines can be built double and a cross-over track used, so that in case of an accident to one side of the machine the other is not incapacitated. Consequently there is no loss of time while repairs are being made. The mechanism of these lifts is not complicated and does not easily get out of order; the only attention required after installing is an occasional oiling. Self-oiling devices are also used, which reduce the wear to a minimum. There is no waste of power in operation, as the steam or air is used only as each car is hoisted.

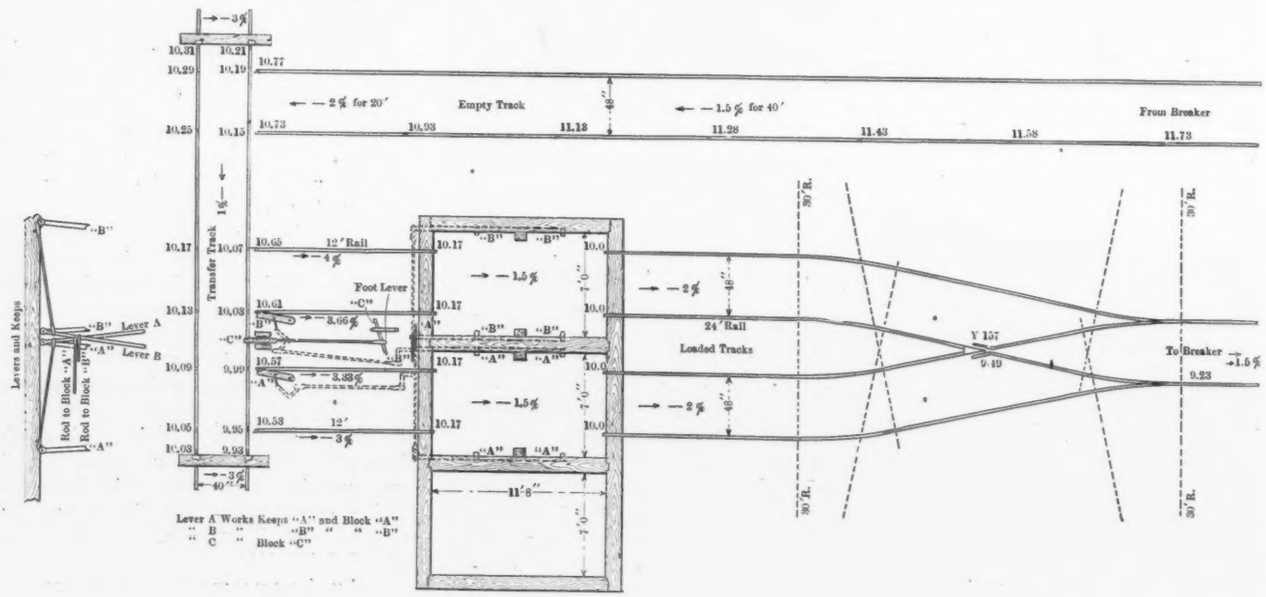

FIG. 7. ARRANGEMENT OF SAFETY LEVERS TO PREVENT ACCIDENT IN TRANSFERRING EMPTY CARS

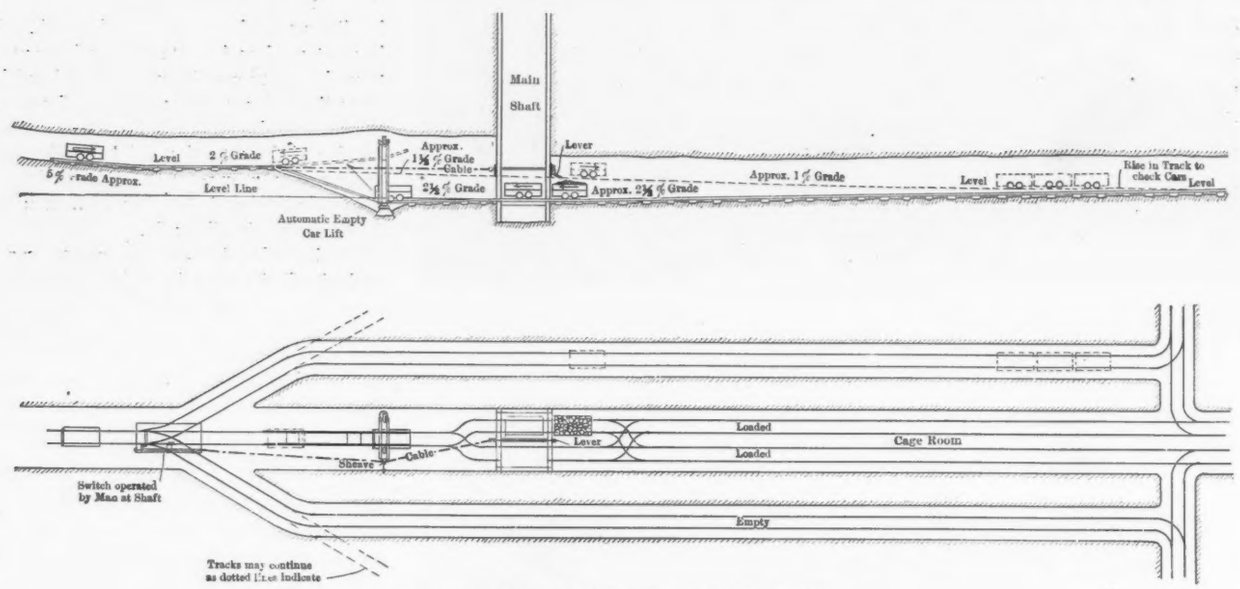

FIG. 10. PLAN OF TRACKS FOR TRANSFER TRUCK

According to London *Engineering*, the new Canadian mint will probably make two-cent nickel coins.

Mexican Petroleum Concession

In May, 1905, the Mexican government granted concessions to Pearson & Son for the exploitation of petroleum deposits in several Mexican states. This act became operative in 1906. The following particulars as to its provisions are taken from the *Journal du Petrole* (Sept. 10, 1907).

The corporation is empowered to develop petroleum in the states of Chiapas, Campeche, Tabasco, Vera Cruz, San Luis Potosi and Tamaulipas; all privileges which the corporation has acquired, last for a period of 50 years. The requirement is made that certain amounts must be spent in development work, and of these amounts, definite proportions, different in the case of each state, must be deposited by Pearson & Son in the National Bank of Mexico as a guarantee of the performance of its part of the bargain.

The concessionaries may export their product free of tax and are also allowed the free importation of machinery and materials. They are exempt from all federal taxes on their capital. They have the right to purchase land at its assessed value; the right to expropriation according to terms fixed in the charter; and the right to construct and operate pipe lines. In return for these privileges, the company agrees to pay into the national treasury 7 per cent. of the value of the annual output of the deposits, and 3 per cent. of the same amount to the treasuries of the respective states. In case the annual production falls below 1,470,000 liters, the share of the national government and of the states is to be reduced in like proportion.

Peat in the United States

The immense areas of peat bogs in the United States still remain practically unutilized according to the United States Geological Survey in a recent bulletin. In the old world peat is largely used as fuel, but the widespread coal beds of this country afford to most localities fuel so cheap and so abundant that but slight inducement is offered to the owners of peat deposits to exploit their possessions.

The expense of preparing peat for use as fuel is considerable, covering five operations, namely: (1) digging from bog, either by hand or machine; (2) transporting in cars or conveying apparatus to mill; (3) disintegrating in mill; (4) molding into bricks; (5) drying until the water is reduced to about 15 or 20 per cent.

A company operating in the vicinity of Orlando, Fla., has departed from this practice slightly, as it now dispenses with the molding into bricks, simply dumping the disintegrated peat on the ground and allowing it to dry in irregular masses, which are later broken with hammers into lumps. This practice is reported to give excellent satisfaction and to save the expense and trouble of bricking the wet pulp. It has the disadvantage, however, of requiring more space for storage. Possibly this method would not work so well in other parts of the United States as it does in the hot climate of Florida.

Another plant established for manufacturing peat into fuel is located at a bog not far from Ogdensburg, N. Y. The plant is built on a large dredge, and the progress of the peat through the machine from the time it leaves the bog until it is delivered in the form of briquets is automatic. The bog is located on the east side of Black lake, in a position that makes dredging operations easy. The peat is raised from the bog in bucket conveyers, dropped into the hopper of a disintegrating machine, passed through steam-jacketed pipes to drive off moisture, and then, while hot, is briquetted under great pressure. According to the claims of the company the product contains less than 5 per cent. of moisture. There seems to be very little doubt that this plant can successfully produce briquets, but whether they can be made cheap enough to compete with Pennsylvania soft coal at $3.25 per ton is a question yet to be answered.

Florida machine peat makes an excellent fuel for the manufacture of producer gas, yielding results fully as good as Texas and North Dakota lignites, and where power is the object sought the best method of utilizing the peat seems to be to convert it into fuel gas. But although the tests so far made demonstrate that the peat can be used in this way, there are many questions yet unsolved. Probably the most important points to be determined are the maximum amount of moisture that can be used in a producer and whether it is necessary to disintegrate the peat and mold it into bricks.

According to Consul J. H. Arnold, of Tamsui, there are about 100,000 tons of coal mined in Formosa each year. The bulk of this is mined in the vicinity of Kelung by native miners, who for the most part use primitive methods.

Production of Slate in 1906

According to the U. S. Geological Survey, nine States reported a commercial production of slate in 1906—Pennsylvania, Vermont, Maine, Virginia, Maryland, California, New York, Arkansas, and Georgia, named in the order of value of output. The production for 1906 was valued at $5,668,346, as against $5,496,207 in 1905.

The production of slate for roofing is measured by "squares," a square being the number of slates required to lay 100 sq.ft. of roof, allowing a 3-in. lap. Since 1903 there has been a gradual decrease in the number of squares of roofing slate made in the United States, and a corresponding decrease in the value of the total product as well as in the price per square.

This decrease is due to several causes, among them a decline in the export trade to the English market, where American slate found considerable sale for several years, but where it has been supplanted by the slate from Welsh quarries and by cheaper, small-sized French roofing slates. Other causes of the decline are labor troubles in the building trades, strikes in the slate quarries, and an increased use of roofing materials that are cheaper than slate or better adapted to flat roofs, which are now more generally used in cities.

The production of slate for milled stock —that is, for table tops, mantels, etc.— has been steadily increasing in quantity and value, the output for 1906 having been larger than for any previous year, its value being $1,219,560, as against $921,-657 in 1905.

Chromite is used in making ferrochrome alloys and, with nickel, for hardening steel for armor plates.

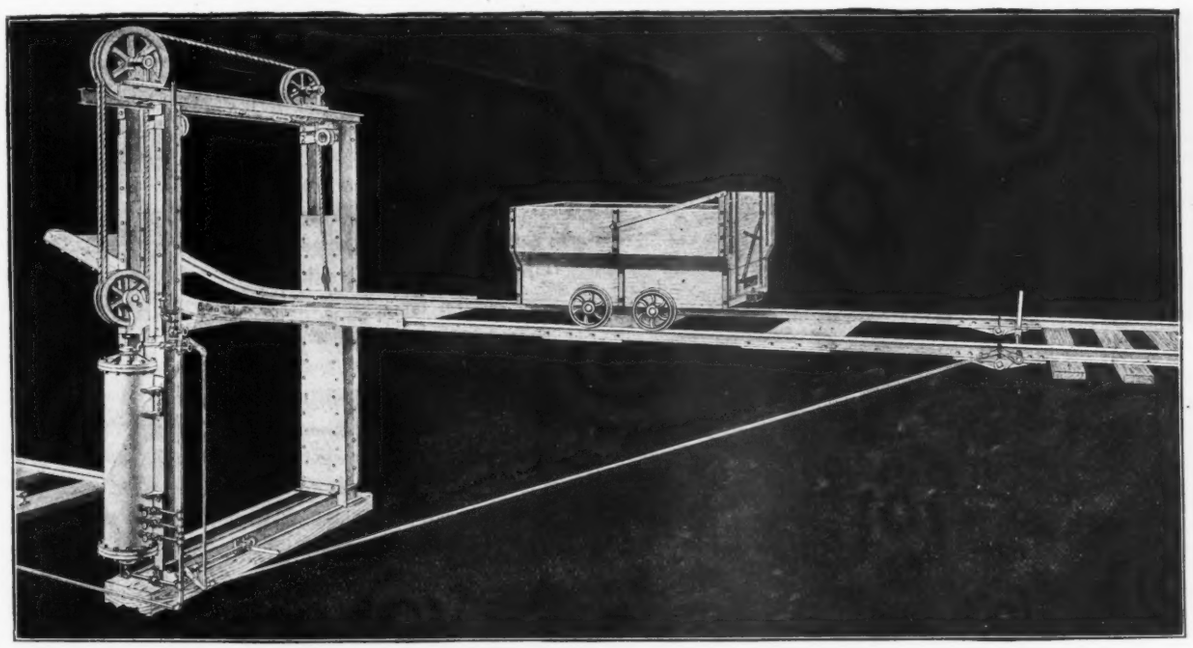

FIG. 9. ARRANGEMENT FOR HANDLING COAL OUTPUT. AUTOMATIC GRAVITY BOTTOM

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The Barnes-King Fiasco

Since the publication of the reports of John Gillie and Charles W. Goodale on the Barnes-King mine, of Montana, which dispelled the illusion that had previously existed with respect to that property, there have been scandalous charges respecting the promotion of the company which took it over. Mr. Gillie and Mr. Goodale rank among the eminent mining engineers of the United States and their high personal reputation is so well known that statements by them as to facts are authoritative. Consequently, it may be accepted that the Barnes-King mine is far less valuable than the investors in it were led to believe. An extraordinary feature of this misconception is that these investors were largely experienced mining men of Butte, including many officials of the Amalgamated Copper Company and among them Messrs. Gillie and Goodale themselves.

However, when it comes to fixing the responsibility for what may be called the fiasco, avoiding for the present the use of a harsher word, it is time to go slowly and reserve judgment until all the facts have been disclosed, which up to the present time is not the case. There has been already a good deal of wild newspaper talk about the matter, which has introduced the names of several well known professional men who have reported, or are alleged to have reported, upon the property. Among these is Walter Harvey Weed, for many years connected with the United States Geological Survey, from which he resigned two years ago to enter private practice. Mr. Weed is one of the most brilliant of economic geologists, who enjoys a high and well merited reputation as a professional man. The gross injustice of the introduction of his name into this Barnes-King matter, and the still greater injustice of connecting him with a mine which he never saw, is manifested by the emphatic and unqualified statements of his letter which is printed elsewhere in this issue.

Iron Production in 1907

The world's production of pig iron during the current year has shown a considerable gain, though somewhat less in proportion than during the two years immediately preceding. With the recent publication of the returns collected by the British Iron Trade Association, we have the official figures for the first half of 1907 for the three larger producing countries, which together furnish nearly 80 per cent. of the world's supply. These are given in the table below, the American and British output being in long tons, and the German in metric tons:

	1906.	1907.	Changes.
United States.....	12,582,250	13,478,044	I. 895,794
Germany.....	6,117,126	6,355,953	I. 238,827
Great Britain.....	4,905,424	5,194,712	I 289,288
Total	23,604,800	25,028,709	I. 1,423,909

The total increase shown was 6.3 per cent., but this was not evenly distributed, the United States leading with 7.1 per cent. gain, Great Britain being second, with 5.9, and Germany third, with 3.9 per cent. While in all three the demand for iron was strong during the first half of the year, the production in Germany was slightly restricted, owing to some difficulty in securing all the iron ore which the blast furnaces needed. Imports of ore were greater this year than in 1906, but not as great as the iron-masters expected. Spanish ore commands too high a price for the German furnaces, and they are turning to Russia for supplies, but there also the cost is enhanced by the long rail transportation required. The British iron makers have also felt the higher prices to which the Spanish ores have been forced by competition. In this country also, the cost of ores has been higher. In view of the advances in fuel, wages and supplies, it is probable that the cost of making pig iron was greater in all three countries than for many years; though in the United States the increase has been the greatest.

A comparison of the classes of iron made by these producing countries is of interest, as showing the differences of practice enforced by the nature of their ore supplies and other local causes. The following table gives the percentages of the different kinds of iron made in each during the first half of the current year:

	U. S.	Germ'y.	G.Brit'n.
Foundry and forge.....	24.1	23.4	44.2
Bessemer pig.....	53.3	3.7	40.5
Basic pig.....	19.8	65.0	12.1
Steel-making alloys....	1.3	7.9	3.2
Charcoal iron.....	1.5	....	....
Total.....	100.0	100.0	100.0

In Germany and Great Britain the make of charcoal pig is insignificant, and in the United States also it is steadily decreasing. Great Britain has adhered to the puddling process much more than either

of its rivals, and this accounts for the higher proportion of foundry and forge iron. Germany is the great maker of basic steel, its position in that respect being the result of its large supplies of high-phosphorus ores. Both the United States and Germany are far ahead of Great Britain in the quantity of steel made; 76.6 per cent. of the German pig iron and 74.4 per cent. of the American being intended for conversion into steel, against only 55.8 per cent. of the British.

It may be worth while to note that in all three countries the statistics of iron production are carefully and correctly collected and compiled by private associations—the American Iron and Steel Association, the German Steel and Iron Union and the British Iron Trade Association.

The Cost of Producing Spelter

In an editorial a fortnight ago we referred to the sharp effect of the decline in the price of spelter to 5c., St. Louis, in restricting the production of zinc ore in the Joplin district. It was far more drastic in its effect upon the Mexican production, because shipments from that country were cut off entirely. Evidently, when spelter fell to 5c., St. Louis, it touched bottom under present conditions in the United States. The smelters sacrificed their margin of profit, and yet the producers in the Joplin district, which is still the source of the major part of the domestic production, could not maintain the necessary output of ore, while Mexico, which for several years has been an important source of supply, disappeared immediately as a producer. It is interesting to note that at the same time when spelter was 5c. at St. Louis, the price at London was equivalent to 4.6 cents.

The average price of spelter at New York during the 10 years ending with 1906 was 5.03c., equivalent to about 4.88c., St. Louis, but the general trend has been upward, because of the increasing cost of production. The latter is due chiefly to the fact that the supply of ore from Wisconsin and other Eastern States, from the States west of the Rocky mountains, and from Mexico has not been sufficient to meet the increase in the demand for spelter and it has been necessary to have recourse to the low-grade sheet ground of the Joplin district. Evidently for the immediate future the production of this ore will be a controlling factor in the market. However, it is well to bear in mind that as recently as 1904 the average price for spelter was as low as 4.93c., St. Louis, and the average for the last five years is only about 5.33c. per pound.

Mining and the Forest Reserve Service

Complaints about the United States Forest Reserve service are rather common in the West at present. There is rarely any objection to the law creating reserves, and criticisms of the higher officials are infrequent. It is usually some arbitrary ruling of some petty officer that furnishes ground for complaint. Many of these complaints, perhaps, have no reasonable grounds, but there are instances in which the miner and prospector has a real grievance; and in so far as the law permits unfair treatment, the law is undoubtedly at fault.

An account of a case which seems to involve a well-founded complaint appeared recently in the *Montana Daily Record*. A mine operator, who had spent more than a quarter million dollars in developing a property in one of the reserves, was informed by a newly appointed supervisor that his claim for patent had been protested, the action being based upon the report of a ranger in the service. The supervisor admitted that he had made no examination, but refused to reconsider his protest, and announced that no matter who took up a quartz claim in his reserve and no matter how much money had been spent in development, the application for patent would be protested unless the existence of a commercial mine could be shown. Certainly it was gross effrontery for an official inexperienced in mining to undertake to determine what might constitute a commercial mine. In this particular case, after the operator had begun to sell off his machinery, a notice arrived, two months later, stating that a higher authority had reversed the supervisor's decision.

It is needless to say that in the establishment of the forest reserves there was no intention to annoy the legitimate prospector. The investment of several hundred thousand dollars, if actually spent in developing mineral bodies, should be evidence enough of good faith, and at least secure for the miner a hearing and immunity from arbitrary and summary interference. The forest supervisor and the ranger are new officials, and it is only natural that considerable friction should follow their appearance in localities which the prospector has learned to consider his own. Most of these difficulties must disappear when matters become adjusted to the new conditions; but the law must prevent undue interference or the mineral lands of the reserves will remain undeveloped. The risks involved in differences of personal opinion and of interpretations of legal language may not be more serious than those natural to mining, but the prospector is not familiar with them, and will, therefore, avoid the forest reserve with its uncertain control.

The Director of the Mint

Frank A. Leach, who was appointed director of the mint to succeed George E. Roberts, resigned, entered upon his new duties Oct. 14. Mr. Leach previously was superintendent of the branch mint at San Francisco. Besides his long and important experience there, Mr. Leach has also had experience in the statistical work of which so much is required in the directorship of the mint, and moreover he is identified with the mining industry with which he is thoroughly in sympathy. He has both the equipment and the personal qualities to be an efficient director of the mint, and the President is to be congratulated for having made so excellent an appointment.

THE GEOLOGICAL SOCIETY of London celebrated the centenary of its foundation by a special meeting and dinner, Sept. 27. Delegates from kindred societies in all parts of the world attended and the functions were entirely successful. One of the most interesting features of the program was the presentation of the gold medal of the Institution of Mining and Metallurgy to Sir Archibald Geikie, president of the Geological Society, an honor well merited by his great achievements in geological science. The Institution's meetings are always held at the Geological Society's rooms, and in other ways the two bodies have friendly connections. The history of the Geological Society is practically identical with that of geology itself. It is only to be regretted that this old and eminent society does not devote more of its proceedings to economic geology and the study of ore deposits.

Colliery Notes, Observations and Comments

Practical Hints Gathered from Experience and from the Study of Problems Peculiar to Bituminous and Anthracite Coal Mining

DEVELOPMENT AND MANAGEMENT

Timber tests show that while small pieces of wood gain greatly in strength by seasoning, the same results are not obtained with large timbers. The larger timbers usually have defects which counteract the gain from seasoning.

The same grade of coke is not adapted for all purposes, each different purpose requires a different grade. For the manufacture of bessemer pig iron a low-phosphorus coke is necessary. Foundry work may require coke high in phosphorus. Coke carrying 1.25 per cent. or more of sulphur can be used for the manufacture of iron, but coke containing less than 1 per cent. is preferable. The coke manufacturer needs a competent chemist in order to place his output in the right market.

In laying tracks for electric haulage standard twisted drills, exactly the same size as the bond terminals should be used in drilling the rails for bonds. The holes should be made exact in size, neither "scant" nor "full," as the terminals are made to insure a perfect fit. In order to secure the best results the distance from center to center of the bond holes should be exactly the same as that between the centers of the bond terminals. Lubricate the drills with soap or soda water but not with oil.

Experience has shown that an electric pump should be located in a dry, clean place. Soft cotton rags should be used to wipe the grit, dust and dirt from the motor, which must be kept clean and properly oiled with the best grade of motor oil, if the best results are to be obtained. Do not allow anything near the motor, such as oil cans, tools or loose pieces of metal that can possibly get into or be drawn into it by magnetic attraction. Emery in any form should not be used on or allowed near a motor.

Experience has shown that a mixture of three parts of the best colza oil with not more than one part of the best paraffin with the flashing point not lower than 80 deg. F. will give a good light when used in safety lamps. It is better to buy the best colza and paraffin separately and mix at the colliery oil house than to buy the mixed oils offered by dealers. All lamp wicks should be dried immediately before they are used. Flat wick tubes have been found to give a better light than round wick tubes.

The variety of nationalities which furnish miners to the Pennsylvania coalfields is shown by the report of accidents occurring in the coal mines of that State last year. This report gives the nationalities of the 480 men reported killed, and the number is no less than 25, as follows: American, English, Welsh, Scotch, Irish, German, Slavonian, Italian, Polish, Hungarian, Austrian, Swedish, Russian, Belgian, Bohemian, French, Finnish, Canadian, Lithuanian, Greek, Tyrolean, Danish, Croatian, Japanese and Syrian.

The recent introduction of suction-gas plants is having a beneficial effect on the anthracite-coal trade of England. A large demand for small sizes, generally from one-half in. to 1 in. in size has sprung up. This class of coal must be clean and free from dust and small pieces which tend to clog the producers. There are a number of breaking and screening plants erected at various Continental ports. The proprietors of these plants buy anthracite large coal and treat and size it themselves. They have the advantage of buying the coal unbroken at a lower price and they also save the heavy loss due to breakage in transit.

If in doubt as to whether a sample of cement is "natural" or artificial, make a test for magnesia. The quantity of magnesia in portland or artificial cement is slight (2 per cent. or so); in "natural" cement it is sometimes over 10 per cent. Portland cement is generally manufactured under the direction of a chemist and is therefore much more reliable and regular than natural cement. Two parts of portland equal three parts of natural cement. In testing cement, tests for fineness should not be overlooked. Material over 100 mesh size is not apt to have any value as cement, and that which does not pass a sieve of this fineness is simply waste.

Experience has shown that a locomotive for entry gathering should be under the best possible control as to quickness in starting and stopping. The wheel base should also be flexible for side-entry gathering-locomotives as they usually run on light rails laid in temporary fashion and not well maintained. A locomotive for face gathering besides requiring all the characteristics of the simple entry gathering locomotive, quickness, flexibility of wheel base, etc., should also be able to operate at close quarters and on sharp curves. A face gathering locomotive should be no larger than a mine car and should be equally free in running anywhere about the mine.

A lever on an electric locomotive should never be held between notches as injurious arcing results from this practice. All parts of the locomotive should be kept clean and the contacts should have a bright polish and be kept properly adjusted. A fine file may be used occasionally to trim up any contacts or fingers that have been burned. Contact strips and fingers should be renewed before they become excessively burned. Always see that every bearing is well oiled, that all drain and overflow ducts and channels for oil are open, so that no oil can flow over into spaces where it does not belong. All electric parts should be kept free from oil, as it damages the insulation.

Use plenty of lubricant on sprocket chains. Pure plumbago should be used when the chain is exposed to gritty substances. Means should be provided for taking up the stretch and wear of chains; however, chains should not be run tight. The pitch of an old worn chain on a new wheel may be corrected by striking each link, on the end of the hook, a blow with a hammer. If the distance between wheels is not too short, sprocket chains may be run for quarter-twist drives or even for cross-belts. The superiority of a sprocket chain as a power transmitter lies in the nature of its construction. It forms a positive belt, does its duty with no waste of power from slipping, and only a slight loss of power through journal friction, which is a large item of loss in flat-belt transmissions.

All miners and fire bosses should be warned against the general practice of turning the common Davy lamp on its side and placing it close against the roof when testing for gases. When this is done, the flame is apt to pass through the gauze as it is quickly heated by the flame cap close against it and when thus heated it offers no protection against the passage of the flame and the lighting of the gas outside the lamp. Also in this position, small particles from the roof fall upon the gauze and this often helps the passage of the flame through the gauze. When a lamp is turned sidewise the gauze almost invariably becomes smoked from the contact with the flame, and the smoke or carbon deposit greatly aids the passage of the flame through the gauze. Dirty gauze is unsafe. Fire bosses often brush the gas down on the lamp with their caps. This also is a dangerous practice and should not be permitted, for by so doing the flame may be blown through the gauze and the gas present ignited.

Views, Suggestions and Experiences of Readers

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal, and Inquiries for Information

CORRESPONDENCE AND DISCUSSION

The Barnes-King Development Company

It has been called to my attention that my name has been used in the public prints in connection with the Barnes-King Development Company, of Montana, especially as having once made an examination of its mine. I wish to state that I never had any connection with the Barnes-King company or the promoters thereof, and never have owned any stock in that company nor have had any interest in it in any way. It is true that I did once examine the Barnes-King mine in behalf of some of my clients who were considering the purchase of the mine, but who concluded not to go any further in the matter. This examination was geological and I neither measured the ore reserves nor made any valuation of them. The use of my name in connection with the Barnes-King Company has been at all times entirely unwarranted.

My attention has also been called to newspaper remarks that at some previous time I made an expert examination of the Clipper-Boss Tweed mine at Pony, Mont. I state emphatically that I never made any such examination, never saw the Clipper-Boss Tweed mine, never wrote a line about it, never saw a report upon it, and never was in Pony.

WALTER HARVEY WEED.

New York, Oct. 15, 1907.

Increase in Gold Production and Commercial Fluctuations

I have read with interest your editorial on Professor Norton's article in Moody's Magazine, and also the condensed original article. It strikes me that your comments are, for the most part to the point and founded on good reasoning from the facts.

The fact that so much money is being tied up in new enterprises, as the St. Paul Extension, which will not make returns for some time, and hence not earn the dividend charges at once, is one good item of your evidence, and the vast extinction of capital in *two* earthquakes and *two* wars has diminished just so much the amount of available capital in the world.

On the other hand it would appear to me that Professor Norton's main argument that the increase in gold production has increased average prices is absolutely sound. It seems to me to be certainly one of the factors that have caused the recent events in the financial world.

Gold is the measure of value of all commodities. Now the production of gold has increased tremendously; faster than has the population of the world in the last 20 years. In addition, the improved efficiency of banking operations has in the main increased the extent to which gold reserves can be used for extension of credits.

Such an increase in gold must raise the price of all commodities until automatically the cost of producing gold is raised by reason of increased prices for labor and supplies to such a point that the production of gold is curtailed, or at least its normal rate of increase cut down. The conclusion of political economists that increase in gold production tends to increase the cost of living is absolutely irresistible in its logic.

The converse proposition that such increase will be cut off automatically is now being seen, and was well brought out by J. H. Curle in his recent article on the gold production of the world. Therein it was shown that Transvaal's gold production was curtailed by increased cost of labor and supplies.

It is of interest to speculate how the money markets of the world would have been affected if the cyanide process had not been made so efficient in large-scale work. This leads me to think that the application of science and improved methods to business and industry has increased the productivity of capital by opening up this new rich land, figuratively speaking, just as the work of the pioneers in this country actually and physically opened up the great rich West. This in my opinion is the basic reason for our recent political and commercial changes. As capital is so productive, interest rates (which are the rate of growth of capital, less certain charges for insurance and profit to the entrepreneur) must increase. But arguments on questions of political economy are only qualitative, and at the best opinions.

WOOLSEY MCA. JOHNSON.

New York, Sept. 28, 1907.

[No one denies that the production of gold has an effect upon commodity prices, but that its effect is what Professor Norton and other economists argue has not been proved. The large and steady increase in the production of gold beginning with 1890 did not prevent a low range of commodity prices during the middle of the last decade.—EDITOR.]

Negative Results in Pyritic Smelting

I have carefully read and considered the interesting articles by Mr. Beardsley and Mr. Lang on "Negative Results in Pyritic Smelting," which appeared recently in the JOURNAL and beg to add my mite to the discussion.

I do not suppose anyone has ever worked a pyritic smelter without "liquation and freeze-ups." I had these troubles with cold blast in the early days and hunted up a remedy. If we consider the fact that silica does not begin to be chemically active, that is, to combine with iron oxide, until red hot through and through, it is obvious we must get it into that condition as quickly as possible; for if the outside alone is heated a coating of iron silicate is formed, and unless this is melted off at once, we are approaching the condition seen in "freeze-ups."

The silica or silicious ores, then, must be rapidly shattered and heated. The sulphides must also be simultaneously broken up and quickly heated, and the required sulphur being expelled, the hot iron oxide and silica will begin to combine at once, and the charge becomes fritted. This prevents liquation. It seems to me that this simultaneous shattering, heating, and fritting of the charge at the very beginning is the key to pyritic smelting, and insures bright tuyeres and other advantages lower down in the furnace; moreover, you can see that the charge starts right, just as in an open-hearth steel-melting furnace. These conditions require a hot top and a warm blast, to keep up the heat and prevent any chilling at the tuyeres.

PRACTICAL OBSERVATIONS

A low ore column of 5 to 7 ft. with a blast pressure of 24 to 32 oz. and a blast temperature of 100 deg. C. works well. With a high take-off for the furnace gases, the flue-dust will be under 2 per cent., and will settle almost entirely in the fore-part of the heater. The blast heater can be constructed economically and efficiently, and the friction reduced to a minimum by choosing proper dimensions and allowing for the expansion of the air.

The furnace gases from a hot top will easily heat the blast to 100 deg. C., and above that temperature I have never found any advantage either in fuel economy or furnace efficiency. By working in this way, not only is liquation pre-

vented, but a high concentration (from 15 or 20 to 1) can be made, with a clean, fluid slag, high in silica, 50 per cent. SiO_2, and low in lime. I notice that the slags high in lime of the cold-blast matting furnaces carry more than 0.3 per cent. Cu, which is more copper than I have often had in my charge; and I have noticed repeatedly with warm blast that 7 per cent. of lime is as much as the slag will carry and keep clean, while varying amounts of alumina do not seem to affect it. Of course it is always high in silica and iron. I dislike lime for it takes up a lot of room, takes fuel to drive off the carbonic acid and water it contains, rarely carries valuable metals, and lowers the temperature of the furnace.

With warm blast you can certainly cut down both lime and fuel. If the top gets too hot, add silica; if cool, add matte, not coke. I have never found any loss of metal in warm-blast smelting. I cannot understand why those Canadian ores cannot be smelted pyritically. Have they ever been tried with a hot top and warm blast? I still hold that a warm blast of 100 deg. C. is a *sine qua non* in pyritic smelting, in spite of all that has been said against it. How many who write against it have ever tried it in a scientific manner? It is like the fly-wheel of a gas engine. Not long ago I was visiting a big copper smelter, when coke was dribbling in and slag and matte were dribbling out. The foreman said to me: "I wish we had a hot-blast stove right here now to save our coke and keep the furnace hot!" He had been in Pittsburg, Penn.

WALTER E. KOCH.

El Paso, Oct. 3, 1907.

American Smelting and Refining Company

Barton Sewell, vice-president of the American Smelting and Refining Company, in view of the unsettled condition of the copper market and the reduction of output made by many copper mines in consequence, made a statement on Oct. 12 as to the situation of his company.

He said its business is at present very profitable, the net earnings being substantially on the same footing as a year ago. On its purchases of ore it neither makes nor loses money by reason of fluctuations in the prices of metals. When the ores are purchased outright the transactions are based on the quotations prevailing on date of settlement, and the company pursues the policy of selling its product as fast as it comes out of the works, so that practically equal quantities of metals are being received and delivered each day on the same price basis.

The company owns no copper mines whatever. A subsidiary company treats large quantities of copper ores, but these are handled on what is known as the "toll basis"—i.e., the copper contents of the ores are not purchased, but after the proper interval for smelting and refining are delivered back to the shippers, who pay a stipulated price for the smelting and refining of the ore.

Past experience has shown that the smelting business is at least as profitable (usually more so) in dull times as when general business is prospering. The greater portion of the ores are received under contracts running for periods of from one to 20 years, so that the margin for profit is not diminished during periods of dulness, while on the other hand expenses are greatly reduced by reason of the decreased cost of labor, coke, coal and supplies of all kinds.

The Smelter-smoke Question in Montana

SPECIAL CORRESPONDENCE

The general fear that has existed throughout Montana and among interests connected with the mining and smelting industries that an injunction might be granted against the Washoe smelter of the Amalgamated Copper Company, has been dispelled by the report and findings made by Judge Oliver T. Crane, master in chancery of the United States court, in a suit of Fred J. Bliss against the Washoe and Anaconda companies. Bliss is a resident of Idaho, but he is the nominal plaintiff in a suit representing a syndicate of farmers of the Deer Lodge valley, near Anaconda, which has been in court for more than two years.

THE FINDINGS OF FACT

A year and a half was consumed in taking testimony, and Judge Crane has had the case under advisement for six months. Nominally he finds that the farmers have suffered some damage by reason of the arsenic sent forth by the big smoke stack at the Washoe smelter, but he makes a strong argument against the granting of an injunction to close the smelter. He finds that the companies are "solvent and able to pay and respond for all damages which have been, or may be, sustained by property from the operations of the said Washoe smelter," and he finds that if the smelter were closed the damage would be greater to the farmers themselves than the damage they would sustain by the continuance of the smelter as it is now operated.

Judge Crane finds that the Washoe company has done everything possible regardless of expense, to make the smoke as little harmful as possible; that the steps thus taken are far more extensive than those in any other smelter in existence. The master finds that the communities about Butte and Anaconda are essentially mining and smelting in character, and that they provide the principal markets for the farmers of the Deer Lodge valley, including the complainants, and that an injunction against the smelter would practically destroy those markets and injure the farmers themselves by greatly decreasing the value of their farms. The closing of the smelter would necessitate the closing of the Butte mines for years, or until a transfer could be made, and the master finds that a site better adapted to smelter work, within easy reach of the Butte mines, could not be found.

THE CASE PROBABLY CLOSED

The mining and smelting companies have never denied that the lands of the Deer Lodge farmers have suffered some damage, but they have objected to be, as they called it, "held up annually by the smoke farmers, who made a business of 'settling with the company.'" The master in chancery fixes the damages to the Bliss ranch at but $350.

Following the long and tedious trial of the case the attorneys for the defendants and the complainants agreed that whatever Judge Crane would find would be the final judgment in the case, as the court itself would not likely review the whole case again, and go through the testimony that required a year and a half in the taking. If their prediction at that time proves correct the milling and smelting industry of Montana will receive protection.

The public of Butte and Anaconda, or of the State for that matter, never regarded the injunction litigation very seriously until the attorneys for the farmers, seeing sentiment and facts going against them, went to Washington and made a personal appeal to President Roosevelt for aid in behalf of the farmers, a harrowing story of robbery, greed and oppression on the part of the mining companies being made to him. The result was that President Roosevelt personally directed experts from the agricultural and forestry departments to come to Montana and assist the farmers by investigations and testimony. Half a dozen of them worked on the case against the smelting and mining companies, and then the public began to fear, because of the presidental interest taken in the case, that the influence might be disastrous to the defendants.

The coal mines of Great Britain are at present regulated chiefly by the act passed in 1887. Additional acts were passed in 1896 dealing with special points in connection with safety; in 1894 and 1905 dealing with checkweighers; in 1900 prohibiting the employment below ground of boys under the age of 13; in 1903 dealing with certificates of competency of managers. The present Royal Commission dealing with safety questions promises to be the cause of many new propositions, which will receive full and earnest consideration.

Personal

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Edwin C. Holden, consulting mining engineer, of New York, has gone to New Brunswick to examine mines.

Frank Dormer, fire boss at the Cameron colliery, Pottsville, Penn., last week left for the West to enjoy the first vacation in 40 years.

Sir Henry Pellatt, of Toronto, Ont., has resigned from the directorate of the Dominion Iron and Steel Company, of Sydney, Nova Scotia.

O. E. Jaeger, recently at Humboldt, Arizona, sailed for Australia Oct. 17, having accepted a position with the Great Cobar Copper Company at Cobar, New South Wales.

President Benjamin Hammond, of the Big Master Mining Company, recently visited the properties of the company in the Manitou Lake district, Ontario, to make an examination.

John Mitchell has formally announced that he will not be a candidate for re-election to the presidency of the United Mine Workers of America, in April next. His reason is the condition of his health.

Edward P. Ryan, according to a press despatch, has resigned his position as assistant manager of the Guanajuato Development Company, Guanajuato, Mexico, and will be succeeded by John S. Butler.

Robert B. Stanton, of New York, has returned home, after spending six months in examinations and tests of placer mines, in Siskiyou county, California, and in making investigations at Tonopah, Nevada.

J. M. Bush has been appointed superintendent of the Ashland mine of the Cleveland-Cliffs Iron Company, at Ironwood, Mich. John R. Reigart succeeds Mr. Bush as superintendent of the Crosby mine of that company at Nashwauk.

Professor John Duer Irving, of the Sheffield Scientific School, Yale University, New Haven, Conn., has returned from Alaska, where he was engaged last summer in examining property for the Guggenheim Exploration Company.

Wright Carver, Sr., has retired after 35 years' continuous service as mine foreman in the employ of the Susquehanna Coal Company. His experience in and around the mines covers a period of more than 60 years. He will reside in future in Nanticoke, Pennsylvania.

Carl Neuffer has been appointed general inspector of the mines of the Pennsylvania Coal Company, with office at Dunmore, Penn. He was recently superintendent of the company's No. 14 colliery, and will be succeeded there by John Reed, late general foreman.

Thomas R. Jones, who had charge of the Warrior Run colliery of the Lehigh Valley Coal Company for the past seven years, has been promoted and will have charge of the Coxe collieries of the same company. He will make his future headquarters in Hazleton, Pennsylvania.

Thomas T. Read, who has been professor of mining and metallurgy in Colorado College, Colorado Springs, Colo., and recently accepted a similar professorship in the Pei-Yang University, at Tientsin, China, sails from San Francisco Oct. 18, to enter upon the duties of his new position.

Walter Blake, of Reading, has been appointed chemist to the Philadelphia & Reading Coal and Iron Company, and will have his headquarters in Pottsville, Penn., where the company has equipped a fine chemical laboratory. Mr. Blake will have charge of the analysis of oils, mine water, experiments on iron, etc. He will also have charge of the treating of mine timber.

Obituary

Thomas McGaw, who died at Sunbury, Penn., Oct. 2, aged 80 years, had part charge of the rail mill at Danville, Penn., in 1845, when T-rails were first rolled in this country.

William H. Piper, who died in Philadelphia, Oct. 4, aged 63 years, had been for many years a miner and shipper of coal. He owned and operated mines at Lilly, Penn. He retired from active business two years ago.

Sylvanus B. Brown, who died at his home in Brooklyn, N. Y., Sept. 30, aged 62 years, was connected for a number of years with the New Jersey Geological Survey. He was also for some years connected with the Thomas Iron Company as geologist and mining engineer, and had served in similar capacities with other iron companies in eastern Pennsylvania and New Jersey.

Societies and Technical Schools

Colorado State School of Mines—This school, at Golden, Colo., has introduced two new graduate courses, one in mining engineering and one in metallurgy. The latter will include electrometallurgy and the chemistry of the rare metals, as well as the subjects usual in metallurgical courses.

Carnegie Technical Institute—Dr. Gustave Fernekes, formerly of the Michigan School of Mines, has been appointed instructor in analytical chemistry at the Carnegie Technical Institute, Pittsburg. K. K. Stevens, formerly chief chemist of the Toledo Furnace Company, Toledo, has been appointed instructor of elementary chemistry in the department of applied science.

Industrial

M. E. Applebaum has been chosen president of the New York Metal Selling Company, which was recently incorporated to deal in ores and metals. He has been for some years past connected with the American Metal Company.

Howell A. Davis has replaced his works at Palatka, Fla., recently destroyed by fire, with a complete new plant, operated by electric power. This plant begins work with a stock of 1,000,000 ft. of seasoned cypress on hand for tanks and similar work.

The Cutler-Hammer Manufacturing Company, which purchased, some months ago, the Wirt Electric Company, Philadelphia, has now consolidated the Wirt business with that of its New York plant, where the manufacture of Wirt apparatus will be continued.

The firm of Fishback, Schmidt & Co., composed of Martin Fishback and Henry A. Schmidt, has established assay and chemical laboratories at San Francisco and Santa Fe streets, El Paso, Texas, in personal charge of Mr. Schmidt. Plans are being made for a complete ore-testing plant as a feature of the business.

Trade Catalogs

Receipt is acknowledged of the following trade catalogs and circulars:

The L. S. Starrett Company, Athol, Mass. Catalog No. 18. Starrett Tools. Pp. 232, indexed, illustrated, paper 5¼x7½ in.

Wile Power Gas Company, Rochester, N. Y. Catalog A. Suction Gas Producers. Pp. 20, illustrated, paper, 6¼x9¼ in.; 1907.

Construction News

Quartz Valley, California—J. M. Morrison, Quartz Valley, proposes to put in machinery at the Luke Shaw mine.

Grass Valley, California—A plant, including hoist and mill, will be put up at the Morning Star mine in Randolph district. The Nevada County Midas Mining Company, Grass Valley, Cal., is owner.

Keokee, Virginia—The Keokee Coal and Coke Company, it is reported, will open new coal mines and build a number of coke ovens. Charles Page Perrin, Keokee, Va., is president.

Jackson, Kentucky—The Imperial Coal Company, a new organization, proposes to open mines and install electric plant. W. E. Cassidy, Lexington, Ky., is president of the company.

Bates, Arkansas—The Harper Coal and Coke Company, is now developing a tract of coal land. Some contracts for machinery have already been let. George W. Harper, Fort Smith, Ark., is president of the company.

Special Correspondence from Mining Centers

News of the Industry Reported by Special Representatives at Denver, Salt Lake City, San Francisco and London

REVIEWS OF IMPORTANT EVENTS

San Francisco

Oct. 12—Although the most important mine on the Mother Lode in Eldorado county—the River Hill, or Gentle Annie—recently closed down because it did not pay any longer, a number of the older mines of the county are about to be reopened and worked on a better scale than heretofore. The Stillwagon, five miles from Grizzly Flat, has been sold to men who will operate the five claims which have been idle for two years. The Larkin mine, in Diamond Springs district, is also to be reopened shortly. The Morey properties have been bonded by men who are able to develop them properly. For some years the output of the quartz mines of the county has been rather small but the starting up of these and a few others should soon make a change.

In the upper camps of the high mountains of Plumas county the North California Mining Company has set men doing annual assessment work, especially at Buck's Ranch, Mountain House district, between Spanish Ranch and the east branch of the Feather river, at Wolf creek, Long Valley and other places where heavy snows may be expected during the winter months. On the finishing of this assessment work, the men will work on the eight-mile ditch the company is building to take water from Soda creek down the east branch of the river to Halsted Flat. During the progress of this work the company has been making some interesting placer discoveries.

The traction men who are hauling freight, ore, materials, etc., for the Union copper mine at Copperopolis, Calaveras county, have gone out on strike because the company made certain changes in the time of operation of the traction trains. These trains take the copper matte from the mine to Milton and bring back oil and supplies.

There is a movement on foot to establish a State union, as a branch of the Western Federation of Miners. A convention has been called to meet in Grass Valley, Nov. 4, and delegates from all miners' unions which have taken action are expected to gather at that time. The Grass Valley Miners' Union, the largest in the State, does not appear to be taking kindly to the proposition and has refused to elect delegates, because the members think the present method of conducting Western Federation business is the best. The movement originated at Greenwater, in Inyo county, where there are as yet no producing mines and where, in fact, the number of miners employed is becoming smaller instead of larger.

The Valley Construction Company is putting up a big rock-crushing plant at Oroville to handle about 1200 cu.yd. daily. The rock is to be screened into five sizes. This company will utilize the great rock-piles thrown up by the mining dredges in their operations. As the rock-crushing companies will use the rocks in the tailings-piles, the surface will again be leveled and soil will be washed down on top where the rocks formerly were.

Interested parties have a proposition to establish a school of mines at Grass Valley, where the most productive quartz mines of the State are located. It is proposed to have a course of mining engineering which will include practical experience in the mines. It is expected that the school will be opened Jan. 5 next.

The Boston machine shops, erected by W. P. Hammon, at Oroville, for making repairs to dredge machinery, have been destroyed by fire, entailing a heavy financial loss and much inconvenience to the dredging industry. The plant included buildings filled with expensive machinery. It is expected that it will be rebuilt at once and meantime repair work for the many dredges will have to be done at the Hammon plant in Marysville, Yuba county, which is not very far from Oroville.

A forest fire in Sonoma county last week destroyed the buildings, furnaces and plant at the Socrates and the Eureka quicksilver mines. Most of the machinery was injured past repair.

The contract of the Independent Sales Agency with the Associated Oil Company at 27c. per bbl. expires Nov. 15. The oil-men of the Kern fields do not think the Sales Agency will make further contracts for less than 50c. on the basis of a one-year contract; and 65c. is spoken of in connection with three-year contracts. The Coalinga Independent Oil Association has been organized in the Coalinga field of Fresno county, and there is a move on foot to sign up all the land in this organization with that of the independent producers of Kern county, so that the two bodies may control all the independent oil in those fields. Down Los Angeles way the Associated Oil Company appears to have captured some 300 new tank cars of the Southern Pacific, so that smaller shippers are wary of making contracts for fear of inability to deliver. A still further shortage of cars is looked for. The Santa Fe company will, however, soon have 500 new cars in service.

Salt Lake City

Oct. 12—The United States Smelting, Refining and Mining Company has requested its clients to reduce production of lead ores, and some of them have taken steps to comply. The Colorado and Beck Tunnel companies, in the Tintic district, have cut down their shipments 50 per cent. Others are doing likewise. Under normal conditions, the two lead smelters operated in the Salt Lake valley should turn out about 13,000,000 lb. of lead monthly. The Murray plant of the American Smelting and Refining Company produced approximately 8,000,000 lb. in September and the United States company a little more than 5,000,000 lb. This product comes from ore shipped not only from Utah camps, but also from those in surrounding States.

Construction work is progressing favorably on the lead smelter of the Tintic Smelting Company, in the Tintic district. The management states that the plant will be ready for commission easily by January next. While the plant will treat custom ores, it is intended more expressly to handle the output of the Colorado, Beck Tunnel and Grand Central mines. Work is going ahead with the construction of the railroad to connect those mines with the smelter. Track-laying will begin next week.

Dividends have been posted by the following companies for payment this month: Colorado, $60,000; Beck Tunnel, $20,000; Uncle Sam Consolidated, $15,000; May Day, $12,000; Lower Mammoth, $14,500; Grand Central, $12,500; Utah, $3000. A reduction of 50 per cent. in the usual amount posted by the Colorado and Beck Tunnel companies is noted.

The pool agreement between the original stockholders of the Bingham Amalgamated Copper Mining Company has been broken. Officers of the company claim the property is now on a paying basis by reason of the strike of high-grade copper ore recently.

It is believed that there will be further reductions made in working forces at the mines. Approximately 1200 men have been let out already in Bingham; 500 less are working in Park City as a consequence of the closing of the Little Bell, Daly, Ontario and Daly West mines because of labor difficulties. The Honerine mine in Stockton has ceased operations. Probably 2000 men have been dropped from the pay rolls in Utah during the past two or three weeks.

An important decision has been rend-

ered in the Federal court here in the case of Thomas F. Keely, of Chicago, and others against the Ophir Hill Mining Company. The question of apex was involved and damages for ore extracted to the alleged amount of $1,800,000. The court found in favor of the defendant.

The annual meeting of shareholders of the Bingham-New Haven Mining Company resulted in the election of Louis E. Stoddard, president; T. W. Farnam, secretary and treasurer; with Fred F. Brewster, E. G. Stoddard, of New Haven, Conn., and E. B. Critchlow, of Salt Lake, directors. C. H. Doolittle, of Salt Lake, is manager. The company is in a good financial condition and its officers say no let-up in development or production is contemplated.

There is no change in the strike situation at Park City. The companies which were compelled to close down are making no effort to resume operations. The Ontario company, however, is working a force of non-union men in opening the drain tunnel adit.

The coal shortage has eased up materially, and the smelting companies are now getting in a storage supply. The shutting down of several of the big mines at Butte and the curtailment made here in Utah have helped to clear up the fuel situation.

Great interest is being manifested in the new oilfields of Iron and Washington counties and there are reasons to believe that the region is going to make good. The oil produced in this field, it is claimed, is of better grade than the southern California product.

Denver

Oct. 12—In Cripple Creek, a number of important strikes have been made over the whole district, some at grass roots and some in old workings, and as far as the mines are concerned, this phenomenal camp seems to have taken on a second life, and but little is heard of it. In the old days of the stock boom, when the Colorado Springs exchange almost rivaled the New York Stock Exhange in the volume of the shares of Cripple Creek stocks dealt in, and each particular broker was advertising and booming his own particular stock, we had a strike for breakfast every morning. Now the district is being worked principally on the leasing system, and strikes have no effect on the Cripple Creek stock market, which is now practically nonexistent. In fact, the dissolution of the Colorado Springs exchange is being agitated.

The Cripple Creek drainage tunnel is making good headway, the heading being now 800 ft. from the portal.

Scranton

Oct. 15—Sugar Notch colliery, No. 9, of the Lehigh & Wilkes-Barre Coal Company, is one of the oldest in the Wyoming Valley, having been sunk in 1865; although it has been mining continuously, its output is still on the increase. Recently the capacity of the mine was tested and in a day of nine hours 911 cars were hoisted and prepared for market.

At a meeting of the three executive boards of the Mine Workers of the Anthracite region, held in Hazleton, it was decided to take up the litigation affecting the miners' certificate law, and to take the case to the highest court in the country, in order to obtain a final ruling in the premises. It is understood that the corporations will take no further steps in the matter.

Toronto

Oct. 15—As a result of the campaign undertaken against wild-cat mining enterprises, the Attorney General of the province has at length taken action for the protection of investors. A number of flotations have recently been made in entire disregard of the provisions of the law, to the effect that all purchasers of stock must be supplied with a prospectus giving specific information as to the amount paid for the property, the sums paid as commissions, promotion expenses, etc., and the interest of each director in the company. Each violation of the act entails a penalty of $200 and repeated proceedings will be unnecessary.

At Turnback lake, lying east of Lake Abitibi, in Quebec, some important mineral discoveries have been made, including silver, bismuth and molybdenite. A shaft has been sunk 40 ft.

A party including Prof. Willet G. Miller, Dr. Barlow and several British journalists have visited the James township silver locations where active development work is going forward. The W. H. Gates property impressed them as promising good results.

A process for the separation of the metals contained in Cobalt ore has been discovered by Dr. J. S. Island, of Toronto. He undertook the experiments with the encouragement of the Ontario government. Until the process has been completed and sufficiently protected details are lacking.

Arthur A. Cole, mining engineer of the Temiskaming & Northern Ontario Railway Commission, reports the discovery of a new mineral area in the Temagami district. He visited a mining location five miles north of Temagami station and about half a mile from the railway. The country rock is fractured diabase, showing numerous quartz veins, one of which was being developed for molybdenum when gold was discovered. In one place, for a few inches, it was rich in visible free gold. Copper was also found in the quartz on another claim near Temagami.

London

Oct. 5—The Central Chile Copper Company, which works the old Panulcillo and other mines in Chile, has just issued the report for 1906. The larger part of the smelting done by the company is at present on ores purchased from neighboring mines, as the properties owned by the company have not yet become large producers. Development at the Panulcillo and others is proceeding and money is being freely spent in providing an efficient plant, so that in all probability the yield of ore will increase considerably in the near future. During 1906 the company's properties yielded 19,000 tons of ore averaging 3.86 per cent. copper and 24,200 tons were purchased averaging 7.42 per cent. This total of 43,200 tons of ore produced matte containing 1857 tons of fine copper. The recovery of gold and silver values brought in £7118. The gross profit was £32,467, and the net profit was £24,202, after providing for depreciation, debenture interest, etc. Out of this a dividend at the rate of 5 per cent., absorbing £15,623, has been paid. The smelting plant is being extended and the additions should be in operation before the end of the year. The finances of the company are in pretty good shape, and the available cash at command places the company in a favorable position as buyer of ores. The debenture debt of £25,682 is being gradually wiped out, and will be completely redeemed early next year. The company disposes of its produce through the American Metal Company, and the contract has recently been renewed on very favorable terms. The only worry which the directors and managers have is the difficulty of obtaining efficient labor. Men are imported from Spain, but almost always desert for the nitrate fields, where wages are higher. The Chilean government is alive to the necessity of obtaining labor and is helping the company as much as possible.

About 18 months ago I recorded the flotation of the Foldal Copper and Sulphur Company, which was formed to work pyrite deposits near Foldal, Norway. Work has progressed rapidly. The aërial ropeway on the Pohlig system, 21 miles long, has been completed for some time and already 27,000 tons of ore have been carried over it. The ropeway is designed to carry 120,000 tons a year, working day shifts only. In addition the hydraulic and electric plant was erected without a hitch and is in regular working order. Other work done was the provision of a wharf at Trondhjem and a railway station at Little Elvedal. The average assay of the ore so far won is 48.12 per cent. sulphur and 2.09 copper. It is free from arsenic and sells readily among alkali makers. The output is sold for several years ahead already. The cash outlay in bringing the mine into operation has been about £120,000.

Mining News from All Parts of the World

New Enterprises, Installations of New Machinery, Development of Mines and Transfers of Property Reported by Special Correspondents

THE CURRENT HISTORY OF MINING

Arizona

Copper production has diminished materially. The Copper Queen mine at Bisbee made only 6,250,000 lb. in September, and the Calumet & Arizona but 3,000,000 lb., as against a combined monthly average this year of about 13,500,000 lb. The Shattuck has cut shipments from 400 to 250 tons a day, the Denn has stopped all shipments. At Globe the production is nearly as high as ever, but many of the small independent mines are stopping shipments. Pinal county properties have almost ceased shipments.

American Saginaw Company—This company, which recently closed work at Bisbee, will drill for a new shaft and abandon the present, which is about 900 ft. deep. With the American pumps closed down the water in the lower developments of the district must all be handled by the Denn.

Calumet & Arizona—The company is running three of its five furnaces, and will probably maintain these for some time.

Cananea-Bisbee—W. B. Thompson, of New York, who has a bond on the Cananea-Bisbee property and has been working there until a few weeks ago, has been granted an extension of time for payments, and will resume operations.

Copper Queen—The company has fired one of its new slag reverberatories. Ultimately it is intended to attach these to all the 10 blast furnaces. They will act as slag settlers and will amalgamate the flue dust, melting it in the stream of slag. About 40 per cent. of the blast-furnace capacity of the works is down. At the mine the work of deepening the Sacramento shaft and connecting it with the mine workings has been resumed. This shaft will be sunk to the 1200-ft. level and will connect both ways, with the old workings on the north and with the Lowell on the south. A large power house is under construction near this shaft which will supply all power for mine operations. It will be equipped with steam turbines generating power for dynamos, the mines to be fitted with motors for all classes of service.

Calumet & Arizona—In the Mammoth district, where the company is working on another group of bonded claims, the Sibley mine has struck high-grade ore.

Mansfield—In the Patagonia country, near Nogales, this old mine shows new signs of life, and its Sweet shaft is to be sunk 250 ft., to the 500-ft. level. In the Blackcap shaft gold-copper-silver showings have been found.

Sitruck Mines Company—A blanket formation of gold- and silver-bearing rock, running $6 to $8 per ton, is claimed by the company, near Tombstone, across the San Pedro river. The formation has been tested, the company states, a length of 2300 ft., and varies from 6 to 12 ft. thick. Several tunnels and crosscuts have been driven in it, and tests are to be made at Charleston of the rock in cyanide.

Costello-Casey—These claims in the Dragoons have been sold to the Calumet & Arizona company for $150,000, 10 per cent. cash, which has been paid. This will form a part of the Leadville group, in the Dragoons, which has been under development by the company for some time.

Greene-Cananea—The company has shut down its No. 1 concentrator, except for the vanner extension tables. No. 2 concentrator is handling about 1600 tons of ore per day and no more than this tonnage of concentrating ore will be mined till conditions right themselves.

Tombstone Consolidated—The company is economizing considerably. It has been under tremendous expense for several years, and has suffered from a most serious water problem. It is still developing the 800-ft. level and will mine and ship steadily.

Twin Buttes Mining Company—This company, Pinal county, is to issue $100,000 in bonds for development and will ship no ore during the present low price of copper. The stockholders are called on to permit the directors to mortgage the property of the company in order to raise money for development and improvement.

California

Calaveras County

Calaveras & New York Mining Company—This company has been organized to work the Ranch mine in Salt Spring Valley.

Poole—The ore from this copper mine at Nassau is now being sacked and shipped to Portland, Oregon, for reduction.

Wise—The claim, owned by R. Wise, in Whiskey Slide district, is being opened, with F. Lagomarsin as superintendent.

Eldorado County

Last Chance—This mine, near Nashville, has shown up a large body of ore on the 400 level. New concentrators are being installed in the mill.

Noonday—The body of copper ore recently discovered in this mine appears large and is being developed by 20 men.

Inyo County

Red Monster Gold and Copper Company—This company has been organized to operate a group of 15 claims extending northerly from the Dunlop.

Greenwater—Fifteen hoists are now in operation at this copper camp, and more extensive development is expected as soon as the weather becomes cooler.

Nevada County

Gold Mound—In this new mine, Deadman's Flat, the shaft is down 160 ft. on a 7-ft. ledge. Howard Dennis is superintendent, and the mine is owned by Wisconsin and Washington people.

Blue Lead—This gravel mine at Relief hill is about to pass into new hands and the owners are combining their interests, so as to give a clear title.

Dredge—The company prospecting the J. S. Goodwin ground on Greenhorn creek has started up its Keystone drill to prove the tract.

Arctic—This mine in Washington township has been bonded to Henry Eckhart, of San Francisco, and Sweet & Bacon, of Oakland.

Union Hill—On the 300-ft. level of this mine, Grass Valley, a strike of ore rich in free gold and galena has been made. The mine only resumed operations recently.

Republic—This mine has been bonded by F. E. Ware and associates, in Willow Valley, and the three tunnels will be extended. A five-stamp mill is also to be erected.

Anchor—This mine, Graniteville, recently bonded by H. W. Overman, is shortly to have a 10-stamp mill.

Placer County

Cash Rock—A dredge for this mine is being built by the Byron Jackson works of San Francisco.

Paragon—Gravel from the upper lead of this old mine at Iowa hill is being taken out by Thomas Brown, who will put it through a mill, as it is cemented.

Kittler—The old tunnel of this mine is being cleaned out and re-timbered by Thomas Foster and Wm. Winkle.

Plumas County

Piston Mining Company—At this mine, Spanisk Peak, they are driving a tunnel to reach the gravel channel.

Indian Valley Mine—At this mine the

work of extending the lower tunnel, now in 420 ft., is progressing. The report that the mine had discharged men and closed down was incorrect. Machinery has been ordered for a 20-stamp mill.

SAN BERNARDINO COUNTY

Cram's Mine—At a cost of $20,000 water has been piped into this mine, nine miles north of Goff's station. In crosscutting at a depth of 350 ft. recently an important strike of high-grade copper ore was made.

SHASTA COUNTY

Gambrinus—At this mine, Whiskeytown, owned by E. Riebe and Chas. Barner, of Redding, sinking has been commenced.

Bell—At this mine, Sunny Hill, L. F. Barlow, superintendent, operations are confined to cyaniding the old tailings. Work will be resumed in the mine itself when water power is again available. The mine is owned by the Marina Marsicana Mining Company.

SIERRA COUNTY

Papoose—A 4-ft. ledge of $18 rock has been struck at this group four miles east of Downieville.

El Dorado—H. L. Johnson, owner of the now famous Tightner, has a bond on this mine and is drifting on a vein of excellent ore.

Colorado

LAKE COUNTY—LEADVILLE

The output for the month of September of all classes of ore was a little over 77,000 tons. The apparent falling off from the previous month was due to the lack of cars. Of this tonnage the Arkansas Valley plant received 60,000 tons, and the balance was scattered among the smelters and zinc plants of this State and Kansas.

A number of properties in the outlying sections are putting in electric plants. During the winter months and in spring, these properties have been worked under great disadvantage. With the installing of electricity the heavy cost of hauling coal will be cut off, and the mines will be able to work steadily the year round. An electric plant is now being installed at the Long & Derry.

Greenback—At this mine, Carbonate hill, the station at the 900-ft. level is about completed; at this point a large pump will be installed. The shaft is down 1350 ft. and from the 900-ft. level to the bottom there are about two miles of workings that will have to be unwatered before any ore is hoisted.

Horseshoe District—The New Monarch Mining Company, which has a lease on the Tip Top and Only Chance claims, is placing a plant of machinery on the former and will operate from the bottom of the shaft. From this level up there are bodies of low-grade lead ore which the company will ship to the smelter at Salida.

Lord Byron—A gang of men working for the Light and Power Company, placing poles up Iowa gulch, last week found it necessary to do some blasting and uncovered a 4-ft. vein of ore. Liberal samples gave high returns in gold and silver. The ground is under lease to the Foxy Grandpa Mining Company.

Rock Hill—William E. Bowden has a lease on the La Plata and is shipping 25 tons daily of a fair grade of hard carbonates from the old stopes. The Delaware shaft is down 575 ft. and is in the lime; another 100 ft. will be sunk, and when this is done, drifting to the orebody opened in the Crecentia to the southwest will be commenced. The Ben Burb and Raven are shipping about 30 tons daily of lead carbonate. Work will be resumed soon on the Only Chance and Great O'Sullivan. At the Alhambra placer, Thomas Ovens is prospecting in the lime-porphyry at the 500-ft. level.

Seneca—After being idle for several months work was resumed on this property, Carbonate hill, a few weeks ago; it is leased by Wallace, Bloton & Jorstad. Work was started at the 300-ft. level where a good body of iron was encountered, from which 40 tons a week is being shipped; the ore runs 10 oz. silver and 45 per cent. excess iron. In addition to this, bunches of high galena are caught during development work. From the Morning and Evening Stars 400 tons daily of a good grade of iron are being sent.

Tennessee Pass District—During September the Jennie June shipped 22 tons of ore that will run 5 oz. gold. The present work is being done by drifts from both sides of the shaft following the vein. The Helen Gould group is being developed by a tunnel; the vein is small but high grade.

Indiana

The miners of the block-coal district have decided to test the new 2½-in. bit law in the courts. A miner will attempt to use a bit that will cut a 4-in. hole, thus inviting arrest and prosecution by the mine inspector.

Chicago, Indianapolis & Evansville Railroad Company—This company has opened headquarters in Evansville and its representatives are taking options on coal lands in several counties in southwestern Indiana.

KNOX COUNTY

Knox Coal Company—This company, whose tipple and entire plant were destroyed by fire, near Bicknell, recently, is making strenuous efforts to get back into operation. A modern steel tipple will be erected and the engine and boiler room rebuilt of brick and enlarged.

Michigan

IRON—MARQUETTE RANGE

The Breitung interests, of Marquette, are preparing to re-explore the old Washington mine tunnel at Humboldt. New timbering will be required the entire length; buildings are going up and machinery is installed. Unwatering is to begin in a few days. Some of the ore that has been in stock for some time will be shipped this fall.

IRON—MENOMINEE RANGE

Michigan—The Oliver company's Michigan mine is idle and will probably remain so for a while longer, as its ore is not of a character that can be used just now. The old Hemlock, also at Amasa, will get out this year about 100,000 tons; it is now down to 1000 ft., and the mine is looking better and more persistent at that depth than for a long time. A mile north of this property is a new exploration that gives good promise, and a small machinery plant has been placed there recently in order to test the ground deeper. About five miles from Amasa, Pickands, Mather & Co. are working with two drills and the understanding is that the results are very encouraging. The Whitesides exploration in the vicinity promises to be important, and Mr. Whitesides has a large tract of land that he proposes to develop.

Missouri

JOPLIN DISTRICT

The shut-down of the mines curtailed the output of ore and sent the market up again. As a result, nearly all the mines are producing again. According to the railroads, about 300 miners left the district during the depression, bound for the West.

Duenweg District—Joseph Stevens and associates of Joplin have made a strike in this district, encountering three bodies of good galena in an 80-ft. prospect hole.

Bull Frog—At this mine, one mile west of Joplin, a new mill has replaced the old one which was recently destroyed by fire.

Ore Exhibit—Germania Hall has been selected as the location of the ore exhibits which will be made at the meeting of the Mining Congress.

New Sheet Ground—A new sheet ground district three miles west of Joplin, is being prospected. The Hero mine on West 7th street is working at the 180-ft. level in sheet ground that runs from 3 to 4 per cent. Directly north is the Columbia Zinc Company's 40-acre lease, thoroughly drilled and one shaft down to ore. The ore is from the 180 to the 196-ft. level and runs well in lead. The company has started to sink a mill shaft 300 ft. east and will erect the mill at once. West is the 40 acres of James Luke, and with the Cambria in the same sheet ground is

equipped with a 250-ton mill. A shaft is being sunk on each 10 acres of this 40. J. W. Harrison is developing the 40 acres north of the Luke property and Frank Nicholson has the 40 acres north of the Columbia drilled. Jamot Brown is drilling three 40-acre lots adjacent. East of the Columbia are the Paragon and Iroquois leases which have the sheet ground drilled but are now operating in the pocket ground above.

Stock Exchange—The new Missouri-Kansas mining exchange will be known as the Joplin Stock Exchange and its membership will be restricted to 200. At a meeting held Oct. 8, a committee was appointed to select a board of 11 directors. James Gallagher, of Boston, Mass., was recommended by resolution for the position of manager.

Montana

SILVER BOW COUNTY

La France—This company, at Butte, is making plans to install a zinc ore separating plant which will comprise 10 Sutton-Steele pneumatic tables, and four Sutton-Steele static separators.

Nevada

ESMERALDA COUNTY—GOLDFIELD

Adams—Development work is being done at the 300-ft. level. The formation the drifts are in bears a considerable resemblance to that in which the rich ore in the Mohawk occurs.

Combination Fraction—Arrangements are being made to send the shaft down to the 1000-ft. level and carry out development. A pumping station will be cut at the 600-ft. level and a large electric pump will be installed. Ore of shipping grade is being broken in the 470-ft. level. The last shipment averaged $165 per ton.

Daisy—A large and rich quartz vein has been cut in the south drift on the 250-ft. level at a point 90 ft. from the shaft. The vein is well-defined and is over 8 ft. in width. This strike is of importance in proving the value of the veins in the Diamondfield section at depth.

Little Florence—The Rogers-Goldfield Syndicate has cut the Little Florence vein in the south drift No. 2 on the 300-ft. level. The pay-shoot is 2 ft. in width and runs high in value. Ore shipments will be made as soon as connections are made between the 300-ft. and 400-ft. levels.

Mohawk-Jumbo—The orebodies are keeping their strength and values are increasing with depth. The pay-roll is $25,000 per month, and the dividends in October amounted to $120,000. The lease will end in less than four months, and the lessees are stimulating production by offering bonuses to the miners.

Nevada Queen—The tunnel on the Congo claim is in 620 ft. and is being run by three shifts. It is proposed to continue the tunnel for a distance of 1600 ft., with the view of tapping a large dike that outcrops on the crown of the hill.

NYE COUNTY—TONOPAH

California—Work has been resumed on this mine under the management of Mark B. Kerr. Efforts will be made to pick up in the lower levels the rich oreshoot that was cut in the southwest drift at the 200-ft. level. Shaft sinking will be continued below the 500-ft. level. It is reported that a strong eastern firm has taken an option on this property.

Garden City—This mine is situated about six miles north of Tonopah. Several of the ore samples lately assayed have given promising returns.

Golden Anchor—Mining will shortly be resumed on this property, which occupies a good position right in the center of Tonopah.

WHITE PINE COUNTY—ELY

Copper Bond—This company has inaugurated developments at its 400-acre tract in the west end of the Ely camp. It is stated that a sufficient tonnage is available to warrant shipments as soon as the smelter is in readiness.

Silver Queen—The Ely Silver Queen Mining Company has been incorporated for the purpose of developing a group of 16 claims in the Tamerlaine district.

Veteran—A rich ore strike is reported at the Veteran property of the Cumberland-Ely Company.

WHITE PINE COUNTY—ROSEBUD

Brown Palace—Work is confined to running two tunnels into the hill and to sacking ore from the open cut. Some of the ore broken in the cut recently was of high grade.

Big Six—The shaft is down 30 ft. and is still on the vein, which continues to assay well. Lateral work will not be started until the 100-ft. level is reached.

Golden Triangle—Tenders are being called for running a drift at the 60-ft. level on the recently discovered vein. This drift will be in the eastern section.

Rabbit's Foot—The annual assessment work is being done on this property, which lies between the Dreamland and Brown Palace and is crossed by the rich Brown Palace ledge.

North Carolina

MACKLENBURG COUNTY

St. Catherine-Rudisell—Heretofore the ore from this mine has been shipped North to smelters; a mill and cyanide works are in course of erection.

MOORE COUNTY

Talc Mine—G. W. Hinshaw has sold his talc property near Glendon to Edward Binney of New York.

RANDOLPH COUNTY

Hoover Gold Mining Company—The property of this company has been sold under execution to E. M. Armfield and associates of High Point. The mines were formerly worked by an English syndicate.

ROWAN COUNTY

Union Mining Company—A mill costing between $35,000 and $40,000 is in course of erection and when in operation will treat the ore now shipped to New Jersey.

South Dakota

LAWRENCE COUNTY

Branch Mint—A $5000 hoist has been installed on the 300-ft. level of the Hoodoo shaft to hoist ore from an inside shaft.

Buxton—A vertical of blue quartz 30 ft. wide is being developed. The ore will be shipped to the Lundberg, Dorr & Wilson mill.

Cleopatra—The 50-ton mill will soon be started and will operate on some new ore encountered in the quartzite 235 ft. deep. The ore carries gold.

Golden Reward—A Dibble slime filter of 100 tons capacity will be installed within the next few weeks. It will be the first of its kind in use in the Black Hills.

Gold Queen—A good ledge of mineralized porphyry has been encountered in a drift on the 200-ft. level. The ore is of milling grade.

Heath—The Montana Mining Company has purchased the property at Nahant and will deepen the tunnel and install machinery in the old mill building.

Horseshoe-Comet and Gold Deposit—J. R. Phelan has been here to arrange for the resumption of work on these properties in which he has acquired the full control. The ore will be shipped East for treatment.

Jupiter—The mine is being pumped out and the mill renovated. Lessees will operate after a shut down of three years.

Portland and Clinton—Supt. Vincent is driving a large working tunnel on the lower quartzite and is in 400 feet.

PENNINGTON COUNTY

Deep Down—An 18-in. vein of high-grade ore has been struck on the 75-ft. level in shaft No. 2. It is free milling widening with depth.

Grand View—A larger air compressor is being installed to carry on the heavy work in the drifts.

Holy Terror—Wm. F. Collins, former manager, has brought suit in the local court for $12,500 alleged back salary due from Charles Morgan, of East Orange, N. J., owner of the property.

Mattes—Tin ore occurring in amblygon-

ite and said to be the first occurrence of this kind on record, has been found on this property near Keystone.

Provident—A carload of amblygonite was shipped to Omaha, together with the concentrates from the tin run at the Tykoon mill.

Tennessee

HICKMAN COUNTY

Phosphate Rock—Large quantities of phosphate are being mined but a reduction is predicted if the railroad cannot supply more cars.

Utah

BEAVER COUNTY

Frisco Contact—The difficulty experienced some time ago in getting labor has been overcome, and development work is in progress.

Moscow Mining—This company has made several shipments during the past month, and recent developments have been gratifying.

JUAB COUNTY

Mammoth—This company has the deepest working shaft in Utah; it is down 2300 ft. A shoot of high-grade gold ore has been encountered and the mine is said to look promising at this depth.

SALT LAKE COUNTY

Bingham Consolidated—The management has practically stopped all development work in the Dalton & Lark and Commercial mines and only a small force is engaged in breaking ore for shipment to the smelter at Bingham Junction.

South Columbus—This company, at Alta, has arrangements completed for the winter campaign of development. The property has been equipped recently with a power plant. The new mine buildings are ready.

Utah Apex—The usual ore production is being maintained from this Bingham mine. The Markham Gulch mill is being used to treat a large tonnage of low-grade ore.

Utah Copper—This company is practically through with new construction at the mine and also at the mill near Garfield. As a result of this the pay-roll has been materially reduced and the company is getting down to a normal working basis.

Yampa—This mine and the smelter in Bingham cañon are closed indefinitely; but the management has retained a small force to make some additional improvements at the smelter. More furnaces will be installed so that the treatment capacity will be brought up to 750 tons daily. Electrical equipment will be installed at the mine.

SUMMIT COUNTY

Uintah Treasure Hill—Repairs have been made to the Creole hoisting plant and shaft and the management will resume mining operations during the next week.

Wisconsin

ZINC-LEAD DISTRICT

The summer months witnessed much activity in the Cuba City camp, where a respectable share of mill building has been in progress. Owing to the fire which consumed the Gritty Six concentrator, and other causes, Cuba City has been forced to a lower tonnage than a year ago. That the mines tributary and shipping from this point will bring Cuba City to the front rank again is only a question of a short time. Five concentrators are in process of construction. These are the Meekers Grove, Midway, Vandeventer, Henrietta and Jarrett. Three which have recently been completed are the Best, Rico and Pine Tree. Of these eight mills, four are equipped to handle 50 tons of mine dirt daily, three will handle 100 tons each and one has a capacity of 200 tons; capacity is based upon one shift of 10 hours per day.

Beacon Hill—This mine is opening up a lead deposit in new ground west of the shaft.

Big Dad—The miniature mill has been increased from 20 tons to 40 tons daily capacity. A Temple electric-air drill has recently been installed.

Big Four—This mine lost all the water in its shaft some weeks ago and was forced to drill a well to feed boilers. It now has abundant water in a hole drilled 371 ft. deep. Several prospect holes drilled ahead of the breast have shown good ore; the hole finished recently revealed extra fine jack between the depths of 66 and 88 feet.

Calvert—This mine has had a battle royal with water, having encountered a veritable lake 90 ft. from the surface; two 14-in. cross-head pumps, throwing 1800 gal. per minute, are kept working continuously. The main orebody lies about 50 ft. below the shaft sump.

Canada

ONTARIO—COBALT DISTRICT

Ore Shipments—Shipments of ore for the week ending Oct. 5 were as follows: Buffalo, 80,000 lb.; Coniagas, 65,000; McKinley-Darragh, 172,260; Silver Queen, 65,000; Trethewey, 118,990; total, 501,250 pounds.

City of Cobalt—A recently discovered vein, 60 ft. from the main shaft at the 65-ft. level, shows 8 in. of rich ore.

Cobalt Central—Rich ore is being taken from the 10-in. vein at a depth of 115 ft. and 155 ft. from the main shaft which is now 175 ft. in depth. The company's force consists of 77 men.

Cobalt Lake—The north shaft is down 26 ft. The crosscut on the niccolite vein, from No. 4 shaft, has been pushed for 38 ft., and on No. 5 shaft a crosscut is now in for 15 ft., toward the No. 4 workings, and stoping has been begun. The shaft at the South end of the lake is down 65 ft.

Foster Mine—Sinking on vein No. 5 has reached a depth of 150 ft. and drifting is being undertaken in three directions following veins 5, 1 and 2. Shaft No. 6 has been closed and all ore will hereafter be handled from shaft No. 5. Shaft No. 1 is down 40 feet.

Kerr Lake (Jacobs)—A 100-lb. nugget has been taken out from the bottom of No. 7 shaft, now down 70 ft. The vein averages from 15 to 20 in. in width, carrying smaltite and native silver.

McKinley-Darragh—Twenty additional stamps have been installed which makes 40 in all. Another vein 18 in. wide, with an average yield of 4000 oz. silver per ton, has been found.

Mexico

CHIHUAHUA

Rio Plata Mining Company—The company has shipped its first bullion from its Santa Barbara mine near Guazapares, seven bars worth $10,000 each, to the Banco Minero at Chihuahua.

Veta Colorado Mining Company—Work has begun on the installation of the 20-stamp mill at Minas Nuevas in the Parral district.

Douglas Copper Company—The Fundicion smelter will be blown in about Nov. 1. The first unit will treat 250 tons of ore daily.

Republica—This mine has reached the producing stage, turning out 18 to 20 tons of 1400-oz. concentrates monthly with the present equipment which is to be increased.

Africa

TRANSVAAL

The gold production for the month of September is reported at 538,034 oz. fine; a decrease of 16,993 oz. from August, but an increase of 32,923 oz. over September, 1906. For the nine months ended Sept. 30, the total was 4,162,468 oz. in 1906, and 4,764,504 oz. in 1907; an increase of 602,036 oz., or 14.5 per cent. The production for this year was $98,482,298 in value.

Australia

QUEENSLAND

Cloncurry—There is great activity in copper mining throughout this district. For several months both Australian and English capital has been steadily flowing into the field. Large orebodies are being developed in some mines and an important strike has been made in the Great Australian mine. The erection of smelters at the Great Australian is proceeding. A quantity of carbonate ore is at grass, and with the sulphides now met with, early smelting returns will be eagerly looked for.

Metal, Mineral, Coal and Stock Markets

Current Prices, Market Conditions and Commercial Statistics of the Metals, Minerals and Mining Stocks

QUOTATIONS FROM IMPORTANT CENTERS

Coal Trade Review

New York, Oct. 16—Already in the West complaints of car shortage and slow transportation begin to be heard. The close of the Lake season is drawing near, but shipments have been so large, that it is probable that the usual rush at the close will be much lighter than usual. The present trouble is at the other end of the line; there is a congestion of coal at the upper Lake ports, which the railroads there do not seem able to remove. Local trade in the West is generally good, but it is difficult to get supplies as fast as they are wanted.

A movement is noted to restore the old inter-State agreement between operators and miners, to replace the district agreements made last May, when the former contract was dropped by the secession of the Pittsburg district operators. This movement was first started by the Indiana operators and has been taken up in Ohio.

In the East the greatest activity is in the Coastwise bituminous trade, as the season of ice and difficult navigation approaches. Demand is good and prices firm.

The anthracite trade is steady with an unusually good demand from all quarters. Small sizes are still scarce and hardly up to requirements.

Coal Traffic Notes

For the nine months ended Sept. 30 anthracite coal shipments were as follows, by companies, in long tons:

	1906. Tons.	1906. Per Ct.	1907. Tons.	1907. Per Ct.
Reading	8,083,782	20.1	10,308,070	20.8
Lehigh Valley	7,334,932	18.2	8,571,590	17.3
N. J. Central	4,960,418	12.3	6,469,784	13.0
Lackawanna	6,744,923	16.7	7,718 669	15.5
Del. & Hudson	3,942,158	9.8	4,907,562	9.9
Pennsylvania	3,427,876	8.5	4,291,305	8.6
Erie	4,010,537	10.0	5,355,118	10.8
N. Y., Ont. & W.	1,791,020	4.4	2,023,518	4.1
Total	40,295,646	100.0	49,645,616	100.0

The total increase was 9,349,970 tons, or 23.2 per cent. All the companies showed considerable gains. The tonnage in 1906 was smaller on account of the stoppage in April. The total figures were given last week.

The Southwestern Interstate Operators' Association reports coal tonnage for the seven months ended July 31 as follows, in short tons:

	1906.	1907.	Changes.
Missouri	1,235,994	1,577,164	I. 341,170
Kansas	2,582,485	3,597,745	I.1,015,260
Arkansas	809,156	1,312,348	I. 503,192
Indian Territory	1,295,965	1,624,121	I. 328,156
Total	5,923,600	8,111,378	I.2,187,778

The total increase was 36.9 per cent. In April and May, 1906, most of the mines were closed on account of the miners' strike.

Coal receipts at Boston for the nine months ended Sept. 30 are reported by the Chamber of Commerce as follows:

	1906.	1907.	Changes.
Anthracite	1,159,911	1,535,009	I. 375,098
Bituminous	2,217,139	2,446,340	I. 229,201
Total domestic	3,377,050	3,981,349	I. 604,299
Foreign coal	511.387	403,458	D. 107,929
Total	3,888,437	4,384,807	I. 496,370

The total increase was 12.8 per cent. The foreign coal is from Nova Scotia and Great Britain.

Shipments of coal and coke originating on the Pennsylvania Railroad Company's lines east of Pittsburg for the year to Oct. 5 were as follows, in short tons:

	1906.	1907.	Changes.
Anthracite	3,314,856	4,296,066	I. 981,210
Bituminous	24,256,683	29,627,357	I. 5,370,674
Coke	9,613,714	10,693,281	I. 1,079,567
Total	37,185,253	44,616,704	I. 7,431,451

The total increase this year was 20 per cent.

New York

Anthracite

Oct. 16—The situation in prepared sizes is a trifle easier this week, and producers state that the car supply is slightly better. The demand is good and considerable coal is being moved both on land and water. Small sizes are in the same position as they have been for some time, and the demand is unabated. Prices are quoted as follows: Broken, $4.75; egg, stove and chestnut, $5; pea, $3.25; buckwheat No. 1, $2.75; buckwheat No. 2 or rice, $2.15@2.25; barley, $1.75, all f.o.b. New York harbor.

Bituminous

The demand continues strong and prices are advancing. Certain brands of George's Creek coal which six weeks ago brought $2.85@3.15 now bring $3.55 per ton. A certain dealer states that, if he had any to sell, 3¼-in. gas coal would be sold on the basis of $1.85 f.o.b. mines, and that run-of-mine gas coal should bring $1.30 at mines.

At the present time it seems to be a question of completing shoal-water orders and producers are doing all in their power to accomplish this. Not only is the demand strong for the far East but also from all quarters. A peculiarity of the situation is that, in spite of the strong demand, there are small lots of coal for sale, and this condition does not exist in times of great stringency.

Car supply continues to be short and this is affecting the labor situation. Transportation on certain parts of the main lines is slow, but on other parts it is rapid. All-rail trade, especially to New England points, is much curtailed and in some instances entirely shut down.

In the Coastwise vessel trade, vessels are short on account of being tied up in the East because of slow discharging. Vessels touching the Maine ice-ports have been trying to obtain higher freight rates, predicting an early closing. This bluff has succeeded in raising the price only a little. Freight rates are as follows: From Philadelphia to Boston, Salem and Portland, 90@95c.; to Lynn and Newburyport, $1.10@1.20; to Portsmouth, $1.05; to Saco and Gardiner, $1.25 and towage; to the Sound 85c. Rates from New York are slightly higher than from Philadelphia.

Birmingham

Oct. 14—It is just a matter of how much coal the railroads can handle in Alabama now. There are enough mines and labor sufficient to fill all the cars that can be furnished by the roads and unless there is a larger supply of cars there is likely to be complaint.

The Standard Fuel Company is putting up a plant in this district to briquet coal slack. It is believed that such an industry would be a paying proposition.

The production of coke in Alabama is active and every ton is in demand. Good prices prevail.

Chicago

Oct. 14—The coal trade is firm. Strength is apparent in every branch of the business, buying being general and increasing. Large consumers and retail dealers are ordering freely all kinds of bituminous supplies. Anthracite has taken on a corresponding degree of strength.

In part the large business is due to the weak market conditions of the last two or three years. Users of coal, finding the market weak chronically during the summer and autumn months, refused or neglected to make contracts for supplies. But in part the increase is due to increased demand for coal, caused by general increase of business by manufacturers, railroads and other users.

In Illinois and Indiana coals, lump is perhaps strongest, the demand being so great that many users are forced to fall back on run-of-mine. Lump and egg rule $2.25@2.65; run-of-mine holds at $1.75@2.50, and screenings are stationary at $1.05@1.40. Brazil block continues scarce at $3.20.

Eastern coals are a trifle weaker, though still strong owing to scarcity of supplies and large demand. Smokeless is $4.30@4.50 for lump and $3.40 for run-of-mine. Youghiogheny at $3.25 for ¾-in. and Pittsburg at $3 for 1¼-in. are steady. Hocking is in short supply and good demand at $3.50. In anthracite the demand is largely for chestnut, and this size is everywhere scarce.

Cleveland

Oct. 15—The scarcity of all grades of Ohio coal in the Cleveland market caused an advance this week of 5c. per ton. The heavy demand for up-lake consignments continues the feature of the market, but coal dealers are unable, on account of the shortage of cars, to make shipments to this point for lake consignment. At Lorain, where the shipping facilities are ordinarily good, the heavy demands of the steel trade are causing a marked preference by the railroads to metal deliveries, and many coal cars are diverted. The retail trade in this city is using all the coal obtainable and manufactories are stocking up for the winter. The following prices are quoted on No. 8 District Ohio coal, at mine: Slack, 70@75c.; mine-run, $1.15@1.20; ¾-in. lump, $1.25@1.30. A strong market is expected to last.

Indianapolis

Oct. 14—For so early in the season the cry of car-shortage is louder and more persistent than ever before. Not only are the local dealers and the mine operators complaining, but the manufacturers also. The Indiana Railroad Commission held an investigation at Terre Haute during the past week. The evidence tended to show that the mines owned by the railroads were supplied with cars four days each week, while the independent mines were operated only two days each week during September. The commission will formulate a set of rules which will prohibit further discrimination. The Indiana Manufacturers and Shippers' Association took an active interest in the investigation, and insists that under the law the commission has the power to make rules regulating the distribution of coal cars.

Pittsburg

Oct. 15—Another advance of 10c. a ton in the price of coal has been ordered, effective today. The new rates are as follows: Mine-run, $1.40@1.50; ¾-in., $1.50@1.60; 1¼-in., $1.60@1.70; slack, 75@85c., all f.o.b. mine. No change has been made in the price of No. 8 Ohio, and Pittsburg prices are now 20c. a ton higher. The demand is heavier than usual, or it is noticed more, as there is a great scarcity owing to the car shortage. Last week the mines in the Pittsburg district operated only to about 50 per cent. of capacity owing to the scarcity of railroad cars.

Connellsville Coke—There has been a decided drop in coke prices during the week, due to various causes. Standard Connellsville furnace coke is quoted at $2.75@2.90 and foundry at $3.25@3.35. There is a great scarcity of railroad cars, or, it is believed, prices would be still lower. The *Courier* in its weekly summary gives the production in both the Connellsville and lower field at 426,859 tons. The shipments amounted to 15,006 cars distributed as follows: To Pittsburg, 4974 cars; to points west of Connellsville, 8253 cars; to points east of Connellsville, 1779 cars.

Foreign Coal Trade

Coal sales at Transvaal mines in July are reported as follows: Middelburg, 152,191 tons; Springs-Brakpan, 80,687; other districts, 24,319; total, 257,197 tons. The average price at mines was $1.3022 per ton. There was an increase of 6532 tons over the June sales.

Coal production in France for the half-year ended June 30, 1907, reached the highest figure ever reported for a similar period. The total was 18,089,718 metric tons, which compares with 15,757,349 tons in the first half of 1906, and 17,695,419 tons in 1905. The increase this year over 1906 was 2,332,369 tons, or 14.8 per cent.; over 1905 it was 394,299 tons, or 2.2 per cent.

Imports and exports of fuel in France for the seven months ended July 31 were as follows, in metric tons:

Imports:	1906.	1907.	Changes
Coal	8 338 950	8,698,830	I. 359,880
Coke	1,352,650	1,272,120	D. 80,530
Briquets	315,510	383 470	I. 67,960
Total	10,007,110	10,354,420	I. 347,310
Exports:			
Coal	762,200	683,500	D. 78,700
Coke	95,500	84,240	D. 11,260
Briquets	64,206	55,030	D. 9,176
Total	921,906	822,770	D. 99,136

The imports were chiefly from Great Britain and Belgium; exports were chiefly to Switzerland and Italy. The exports include steamship fuel for foreign trade.

Iron Trade Review

New York, Oct. 16—The iron and steel trade continue quiet, so far as new business is concerned. Owing to the peculiar position manufacturers are not generally making any concessions to secure business, and are not likely to do so until the dullness in trade seems likely to outlast the present activity at the mills. This applies to finished material; in pig iron some of the furnaces have been offering inducements to buyers; but without inducing many sales.

Iron-ore shipments from the Mesabi and Vermillion ranges in September were 4,650,000 tons, bringing the total for those ranges for the season up to 21,000,000 and the total for the Lake region up to 31,000,000 tons. It now seems probable that 40,000,000 tons will be reached, or exceeded, before navigation closes.

Pig Iron Production—The report for Oct. 1 shows on that date 333 anthracite and coke furnaces in blast, having an aggregate weekly capacity of 511,400 tons of pig iron weekly; an increase of 3700 tons over the September report, but a decrease of 16,770 tons from July. Taking the estimate of the *Iron Age* for September and making an allowance for the charcoal furnaces, the output of pig iron in the United States in September was 2,238,500 tons; and for the nine months ended Aug. 31 a total of 20,297,544 long tons.

Pig Iron in Great Britain—The production of pig iron in Great Britain, as reported by the British Iron Trade Association, for the half-year ended June 30 was, in long tons:

	1906. Tons.	1906. Per Ct.	1907. Tons.	1907. Per Ct.
Forge & foundry	2,148,273	43.8	2,295,918	44.2
Hematite iron	2,009,276	40.9	2,103,248	40.5
Basic iron	630,660	12.9	626,337	12.1
Spiegel & ferro	117,215	2 4	169,209	3.2
Total	4,905,424	100.0	5,194,712	100.0

The increase in forge and foundry was 147,645 tons; in hematite, or bessemer pig, 93,972; in spiegel and ferro, 51,994; with a decrease of 4323 in basic pig. The total gain was 289,288 tons, or 5.9 per cent. The average number of furnaces in blast in 1907 was 378, showing an average output of 12,977 tons per furnace.

Iron and Steel in France—The production of pig iron in France for the half-year ended June 30 is reported as follows, in metric tons:

	1906.	1907.	Changes.
Foundry iron	282,625	293,564	I. 10,939
Forge iron	344,291	355,230	I. 10,939
Bessemer pig	80,354	62,102	D. 18,252
Basic pig	841,398	1,048,152	I. 206,754
Special irons	24,836	29,182	I. 4,346
Total	1,573,504	1,788,230	I. 214,726

The total increase was 13.6 per cent. The output of wrought iron and steel was, in metric tons:

	1906.	1907.	Changes.
Wrought iron	384,800	342,239	I. 42,561
Steel ingots	1,159,546	1,309,993	I. 150,447
Finished steel	711,658	802,778	I. 91,120

Finished steel does not include metal sold in the form of blooms and billets. The chief items this year were 374,806 tons bars and merchant steel, 205,731 tons rails and 177,568 tons plates and sheets.

Baltimore

Oct. 15—Receipts for the week included 929 tons of ferromanganese and 50 tons of manganese ore. There were 6148 tons of chrome ore and 157 tons nickel ore received from New Caledonia. No iron ore cargoes arrived during the week.

Birmingham

Oct. 14—The pig-iron market in Alabama is still very quiet. Despite this condition the production is being kept up. There is no accumulation; in some instances special efforts are being made to get iron out on orders, so urgent is the need on the part of consumers. As to the railroad-car shortage, the conditions are felt more in the raw material field than with finished iron. Quotations remain firm, though the demand is slow. No. 2 foundry, for delivery during the balance of the year, with but little to be had, is bringing $18@18.50. The inquiries for the product for delivery during the first half of 1908 indicate that there is need of iron.

No change is reported in steel. The make is a little better and the shipments equal to the output. Inquiries are being received almost daily.

Chicago

Oct. 14—The pig-iron market continues inactive. From both sides it appears to be a waiting market. Inquiries for 1908 business fluctuate; one week they are reported large, the next week small; sales for the first quarter are practically nothing yet. Carload sales are increasing, a sure sign that the average melter is running very close to his needs.

On last-quarter deliveries Southern No. 2 brings about $18 Birmingham ($22.35 Chicago) and Northern $22.50 @23. There is practically no premium business, though occasionally talk is heard of a premium of 50c.@$1 on a small lot hurried forward.

Finished iron and steel products are strong. The market is based on the average consumer's feeling that prices of pig iron must come down.

Cleveland

Oct. 15—The ore docks are being piled high and tonnage is coming down the lakes freely. The American Shipbuilding Company took two contracts last week for two large freighters, and today the awarding of two other vessel contracts was announced. This, with increased demands from the structural trade, indicates that the market will be active this winter. A brisk inquiry is noted for pig iron. The following prices are quoted for the balance of the year: Bessemer, $22.90; No. 1 foundry, $22@22.50; No. 2, $21.50@22; No. 3, $20.50@21.50; No. 2 Southern, $22.85; Gray forge, $20@20.50 per ton.

Philadelphia

Oct. 16—Two conditions have contributed to a slight improvement in the tone of the pig-iron market, viz., increasing inquiries from the smaller consumers and run-down stocks. Basic promises to sell freely; negotiations are creeping along toward a favorable termination for large sales, but at weak prices. Some New England consumers are among recent buyers. Prices on the surface are the same as a week ago.

Steel Billets—Mills are quite prompt in their deliveries and users are buying in a small way, just to keep going.

Bars—The bar-iron trade has held up well.

Sheets—Favorable conditions continue and all weights are selling.

Pipes and Tubes—The industries which absorb pipes and boiler tubes are as busy as ever, but the managers contract far ahead.

Merchant Steel—Business has fallen off since the first of the month.

Plates—The ordinary demand for iron and steel plates is as good as ever, but large orders are scarce.

Structural Material—New business is unimportant. The Pencoyd mill has suffered a serious loss by fire.

Scrap—A gradual but slow improvement is in progress.

Pittsburg

Oct. 16—While there is still some new business being placed in the different finished lines, the orders are so small that they are scarcely noticed. All the mills, however, continue in active operation with enough business in sight, if specifications come in, to keep them going steadily all the year and in some lines into the first quarter of next year. Specifications are entirely satisfactory but it is not known when there will be a drop. The outlook does not appear to be encouraging, but it is certain there will not be any extensive closing of plants. In most of the finished lines prices are being firmly maintained and it is asserted there will be no official reduction in any branch.

Pig Iron—The first real transaction in pig iron in several weeks was recorded today, when a sale of 500 tons of basic pig iron for prompt delivery was made at $20, Valley furnaces. A small lot of No. 1 foundry also was sold, the price being $21.50, Pittsburg. It is reported that an independent steel interest is in the market for 6000 tons of bessemer iron but the report is doubted. There have been no transactions in bessemer iron for a long time, and $22, Valley furnaces, remains the nominal quotation. Corrigan, McKinney & Co. announced a week ago that they would put the Josephine furnace on bessemer iron if they could get orders for about 20,000 tons for November and December delivery. The company's agents in this district have so far failed to get the business desired. There is no demand for gray forge and it is believed $18.75, Valley furnace, can be done. No. 2 foundry is quoted around $21, Pittsburg.

Steel—Prices of billets continue weak; bessemer billets are quoted at $29 and open-hearth at about $30, but it is believed these prices could be shaded. Sheet bars are firm at $31. Plates remain at 1.70c. and merchant steel bars at 1.60c.

Sheets—The market is extremely dull and, although prices of black sheets are shaded about $2 a ton, it is not bringing in any new business of consequence. Black sheets are quoted at 2.60c. and galvanized at 3.75c. for No. 28 gage.

Ferro-Manganese—Ferro has taken another drop and for prompt shipment is quoted at $56@56.50, Pittsburg.

Sault Ste. Marie

The total freight passing through the Saulte Ste. Marie canals in September was 8,532,706 tons. For the season up to Oct. 1 the total was, in net tons:

	1906.	1907.	Changes.
East-bound.....	30,069,562	32,556,664	I. 2,487 102
West-bound.....	7,134,875	9,502,430	I. 2 367,555
Total.....	37,204,437	42,059,094	I. 4,854 657

The number of vessels passing the locks this year was 15,100, showing an average cargo of 2783 tons. The mineral freights included in the total were as follows, in net tons, except salt, which is given in barrels:

	1906.	1907.	Changes.
Anthracite.....	661,873	1,035,790	I. 374,917
Bituminous.....	5,482,914	7,553,120	I. 2,070,206
Total coal.....	6,143,787	8,588,910	I. 2,445,123
Iron ore.....	26,485,982	28,883,106	I. 2,397,124
Pig & manu. iron	264,066	230,551	D. 33,515
Copper.....	77,045	52,689	D. 24,356
Building stone...	4,472	748	D. 3,724
Salt, bbl.....	297,879	337,367	I. 39,488

Iron ore was 68.7 per cent. of the total freight this year, and coal 20.4 per cent. There was an increase of 39.8 per cent. in coal.

Metal Market

NEW YORK, Oct. 16.

Gold and Silver Exports and Imports

At all United States Ports in Sept. and year.

Metal.	Exports.	Imports.	Excess.
Gold:			
Sept. 1907..	$ 1,503,836	$ 2,734,086	Imp.$ 1,230,250
" 1906..	1,178,922	31,431,038	" 29,152,116
Year 1907..	49,879,813	30,837,287	Exp. 19,042,526
" 1906..	35,789,962	111,776,017	Imp. 75,986,055
Silver:			
Sept. 1907..	6,048,457	3,789,113	Exp. 2,259,344
" 1906..	3,594,311	3,262,559	" 331,752
Year 1907..	47,970,793	34,454,571	" 13,516,222
" 1906..	45,441,339	32,994,069	" 12,447,270

These statements cover the total movement of gold and silver to and from the United States. These figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Movement, New York

For week ending Oct. 12 and years from Jan. 1

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week.....	$ 971	$ 365,552	$ 794,169	$ 145,777
1907.....	32,506,558	8,237,924	41,460,588	2,261,286
1906.....	5,966,713	86,007,231	43,596,685	1,695,443
1905.....	32,297,368	9,642,156	27,601,096	3,674,599

Exports of gold for the week were to Panama; of silver to London and Paris. Imports for the week, both gold and silver, were from Mexico and the West Indies.

The joint statement of all the banks in the New York Clearing House for the week ending Oct. 12 shows loans $1,083,401,900, a decrease of $5,666,500; deposits, $1,026,047,900, a decrease of $10,655,500, as compared with the previous week. Reserve accounts show:

	1906.	1907.
Specie.....	$202,511,200	$198,558,800
Legal tenders.....	73,207,200	62,608,600
Total cash	$275,718,400	$261,167,400
Surplus.....	$13,024,400	$ 4,655,450

The surplus over legal requirements shows an increase of $2,007,375, as compared with the previous week this year.

Specie holdings of the leading banks of the world, Oct. 12, are reported as below, in dollars:

	Gold.	Silver.	Total.
Ass'd New York	.....	.....	$198,558,800
England.....	$176,256,825	.....	176,256,825
France.....	553,859,075	$186,451,230	740,310,305
Germany.....	143,000,000	39,630,000	182,630,000
Spain..	77,815,000	127,540,000	205,355,000
Netherlands....	30,281,000	26,177,000	56,458,000
Belgium	16,323,335	8,166,665	24,490,000
Italy..	173,685,000	24,345,500	198,030,500
Russia	619,505,000	28,930,000	648,435,000
Aust.-Hungary.	226,235,000	59,405,000	285,640,000
Sweden.....	21,230,000	.....	21,230,000

The banks of England and Sweden report gold only. The New York banks do not separate gold and silver in their reports. The European statements are from the cables to the *Commercial and Financial Chronicle* of New York.

Shipments of silver from London to the East are reported by Messrs. Pixley & Abell as follows, for the year to Oct. 3:

	1906.	1907.	Changes.
India.....	£ 12,478,563	£9,116,254	D. £ 3,362,309
China.....	430,700	.....	D. 430,700
Straits..	1,750	625,950	I. 624,200
Total.....	£ 12,911,013	£9,742,204	D. £ 3,168,809

Receipts for the week were £8000 from New Zealand, £3000 from China, £5000 from Chile and £207,000 from New York; a total of £223,000. Exports were £137,100 in bars and £4000 in Mexican dollars; £141,000, all to India.

The movement of gold and silver in Great Britain for the eight months ended Aug. 31 was as follows:

Gold:	1906.	1907.
Imports	£30,180,891	£31,138,757
Exports	20,015,129	21,503,887
Excess, imports.....	£10,165,762	£ 9,634,870
Silver:		
Imports	£13,225,068	£11,181,054
Exports	14,038,388	11,943,172
Excess, exports.....	£ 813,320	£ 762,118

Of the silver imports this year, the United States furnished £7,817,635, or 69.9 per cent. of the total.

Gold and silver exports from Mexico for the fiscal year ended June 30 are reported as follows, in United States currency:

Gold:	1906.	1907.	Changes.
Mexican coin.	$119	$14,937	I. $14,818
Bullion, etc...	$15,784,377	$11,874,175	D. $3,910,202
Total.....	$15,784,496	$11,889,112	D. $3,895,384
Silver:			
Mexican coin.	24,736,170	12,211,917	D. 12,524,253
Bullion, etc...	32,950,944	31,549,832	D. 1,401,112
Other forms..	4,762,127	5,969,422	I. 1,207,295
Total.....	$62,449,241	$49,731,171	D. $12,718,070

The decrease in gold exports last year was 24.7 per cent.; in silver, 20.4 per cent.

The gold and silver movement in France for the eight months ended Aug. 31 is reported as follows:

Gold:	1906.	1907.
Imports....	Fr. 375,014,000	Fr. 335,440,000
Exports.....	91,616,000	83,723,000
Excess, imports....	Fr. 283,398,000	Fr. 251,717,000
Silver:		
Imports.....	106,048,000	121,011,000
Exports.....	110,509,000	119,104,000
Excess.....	Ex. Fr. 3,461,000	Im. Fr. 1,907,000

Imports of copper and nickel coins were 71,000 fr. in 1906, and 60,000 fr. in 1907; exports were 155,000 fr. in 1906, and 324,000 fr. this year.

Prices of Foreign Coins

	Bid.	Asked.
Mexican dollars.....	$0.47⅝	$0.52½
Peruvian soles and Chilean.....	0.43½	0.47½
Victoria sovereigns.....	4.85	4.87
Twenty francs.	3.87	3.92
Spanish 25 pesetas..... ...	4.78	4.80

SILVER AND STERLING EXCHANGE.

Oct.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.	Oct.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.
10	4.8585	63⅝	29 7/16	14	4.8640	60⅜	27⅞
11	4.8607½	63¼	29 7/16	15	4.8625	61¼	28⅛
12	4.8610	62⅜	28⅞	16	4.8635	61¼	28⅛

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver, 0.925 fine.

Other Metals

Oct.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. Cts. per lb.	Spelter. New York, Cts. per lb.	Spelter. St. Louis, Cts. per lb.
10	13¾ @14¼	13⅛ @13¾	62	32½	4.75	5.50 @5.55	5.35 @5.40
11	13⅜ @13⅝	13¼ @13⅜	60¼	32¼	4.75	5.45 @5.50	5.30 @5.35
12	13⅜ @13⅝	13 @13¼	.....	32	4.75	5.45 @5.50	5.30 @5.35
14	13¼ @13⅝	13 @13¼	60½	31⅝	4.75	5.45 @5.50	5.30 @5.35
15	13⅛ @13⅜	12¾ @13	59⅛	31¼	4.75	5.45 @5.50	5.30 @5.35
16	13⅛ @13⅜	12½ @13	60	31⅛	4.75	5.45 @5.50	5.30 @5.35

London quotations are per long ton (2240 lb.) standard copper, which is now the equivalent of the former g.m.b's. The New York quotations for electroytic copper are for cakes, ingots or wirebars, and represent the bulk of the transactions made with consumers, basis, New York, cash. The price of cathodes is 0.125c. below that of electrolytic. The lead prices are those quoted by the American Smelting and Refining Company for near-by shipments of desilverized lead in 50-ton lots, or larger. The quotations on spelter are for ordinary western brands; special brands command a premium.

Copper—In the early part of the week the leading interest reduced its price to 13½c. for electrolytic, delivered at buyers' works, cash in 30 days. This dashed the hopes of an improvement in the market, which had been inspired by increasing inquiries from domestic consumers, inasmuch as the reduction referred to was immediately followed by underselling by other producers. Consumers are now afraid that another reduction will be made, and are encouraged in that belief since sellers are ready to book orders much below the aforesaid figure and considerable transactions, chiefly for export, have been made on a downward scale. Domestic consumers are still making inquiries, but under the circumstances are naturally pursuing a waiting policy. The quotations at the close are 13¼@13½c. for lake copper, and 12½@13c. for electrolytic. Business in casting copper has been done during the week at 12½@13c.

On a scale downward, considerable quantities were handled in Europe, where an arbitrage business could be effected owing to the proximity of the price of standard copper to that of refined sorts. The short interest in the standard market sustained prices and the bear operators utilized the favorable opportunity to cover part of their large commitments on a scale downward. Prices touched £58 for spot and £57 for three months, but on the publication of the statistics, which decreased 1500 tons, there came a rally at the close to £60 for spot, £58 15s. for three months.

Refined and manufactured sorts we quote: English tough, £57; best selected, £64; strong sheets, £70.

Exports of copper from New York and Philadelphia for the week were 6308 long tons. Our special correspondent gives the exports from Baltimore for the week at 887 tons of copper.

Copper Sheets—The base price of copper sheets is 20c. per pound.

Copper Wire—The base price of copper wire, No. 000 to No. 8, is 16¼ per pound.

Tin—The decline in London has made further progress, the low point being reached on Oct. 16, when the market touched £135 10s. for spot, £135 for three months. At the close, the market is reported as firm (which, strange to say, has been the case almost daily) at £138 10s. for spot, £136 10s. for three months.

Spot tin, the only delivery which is in demand in this market, is still rather scarce, being held at a premium and com-

manding about 31½c. per lb. The severe decline reported constantly from London naturally has scared buyers off entirely, so that no transactions of consequence for future delivery are taking place.

Lead—The price of the American Smelting and Refining Company for desilverized remains unchanged at 4.75c. New York, and 4.67½c., St. Louis. In the outside market lead continues to be freely offered at a discount. Early in the week there were signs of improvement in the demand for electrical purposes, but this does not seem to have materialized and offers of 4.55@4.60, New York, have been accepted, and as low as 4.45@4.50c. St. Louis. Yet production has been restricted in Utah, Idaho, and Missouri, which are the chief sources of supply.

Cable reports from London are to the effect that lead at last is following the general trend, and there is heavy selling of future deliveries even though it can only be done at a considerable discount. The close is weak at £18 5s. for Spanish lead, £18 7s. 6d. for English lead.

Spelter—Consumers appear to have filled their most urgent requirements for the present and the market has quieted down. The close is steady at 5.45@5.50c. New York, 5.30@5.35c. St. Louis.

The London market has been barely holding its own, closing at £21 15s. for good ordinaries, £22 for specials.

Zinc-Sheets—The base price is now $7.50 per 100 lb.—less discount of 8 per cent.—f.o.b. cars at Lasalle and Peru, in 60-lb. cases for gages No. 9 to 22, both inclusive; widths from 32 to 60 in., both inclusive; lengths from 84 to 96 in., both inclusive. The freight rate to New York is 27.50c. per 100 lb.

Silesian Spelter Market—Paul Speier reports from Breslau, Germany, under date of Sept. 28, that at the beginning of the month spelter prices fell somewhat from previous quotations. This lowering of price induced active inquiries for the metal and notable quantities were taken up by consumers. Any considerable variation in present quotations is not to be expected. In Silesian markets prices are 42@43.50 marks per 100 kg. (4.54@4.70c. per lb.) f.o.b. works. Zinc dust is quoted in 10-ton lots at 42.50@43.50 marks per 100 kg. (4.6@4.7c. per lb.) f.o.b. Stettin, barrels included.

Antimony—Consumers are carrying out a waiting policy and show no disposition to buy. Owing to this the market is a little weaker. The supplies are moderate, but amply sufficient to meet the present small demand. Conditions abroad are similar to those in the local market. Prices are as follows: Cookson's, 12c.; Hallett's, 10½@10¾c.; ordinary brands, 10⅛@10½c.

Nickel—For large lots, New York or other parallel delivery, the chief producer quotes 45@50c. per lb., according to size and terms of order. For small quantities prices are 50@65c., same delivery.

Quicksilver—This metal is steady. Current prices in New York are $40.50 per flask of 75 lb. for lots of 100 flasks or over. For smaller orders prices run up, according to size and conditions, reaching $55@57 for retail lots. San Francisco prices are $37.50@39 per flask for domestic business, and $36@37 for export. The London price is £7 7s. 6d. per flask.

Platinum—The market conditions remain practically the same. The demand among the users of chemical ware is reported as good as usual at this time of the year, but manufacturers of electrical supplies, who use platinum for contact points, etc., are not consuming as much as usual. Quotations are as follows: Hard metal, $30; ordinary, $27.50; scrap, $22 per troy ounce.

Imports and Exports of Metals

Copper—Exports of copper from the United States for the eight months ended Aug. 31 are reported as below by the Bureau of Statistics of the Department of Commerce and Labor, in long tons, of 2240 lb. each.

	1906.	1907.	Changes.
Great Britain	16,028	10,928	D. 5,100
Belgium	1,495	721	D. 774
France	24,166	18,652	D. 5,514
Italy	5,519	5,542	I. 23
Germany and Holland	78,202	62,545	D. 15,657
Russia	1,951	1,636	D. 315
Other Europe	7,905	6,719	D. 1,186
Canada	1,208	989	D. 219
China	1,602	..	D. 1,602
Other countries	167	210	I. 43
Total metal	138,243	107,942	D. 30,301
In ores and matte	4,356	4,363	I. 7
Total	142,599	112,305	D. 30,294

The total decrease was 21.2 per cent. The actual quantity of ores and matte exported this year was 67,727 tons, of which 55,492 tons went to Canada, 11,936 to Mexico, and 299 tons to Europe.

Imports into the United States of copper and copper material for the eight months ended Aug. 31, with re-exports of foreign metal, are reported as follows; the figures give the contents of all material in long tons of fine copper:

	Metal.	In ore, etc.	Total.
Mexico	25,067	11,771	36,838
Canada	9,544	3,699	13,243
Great Britain	10,720	.....	10,720
Japan	2,663	.....	2,663
South America	.....	2,162	2,162
Other countries	18,784	1,717	20,501
Total imports	66,778	19,349	86,127
Re-exports	344	....	344
Net imports	66,434	19,349	85,783
Net imports, 1906	50,313	15,001	65,314

The total increase in the net imports was 20,469 tons, or 31.3 per cent. The actual tonnage of ores and matte imported from Mexico this year was 72,213 tons; from Canada and Newfoundland, 89,488; from South America, 16,173; from other countries, 27,992 tons.

The exports and net imports compare as follows for the eight months:

	1906.	1907.	Changes.
Exports	142,599	112,305	D. 30,294
Net imports	65,314	85,783	I. 20,469
Excess, exports	77,285	26,522	D. 50,763

This shows a decrease this year of 65.7 per cent. in the excess of exports.

Tin—Imports of tin into the United States for the eight months ending Aug. 31, were as follows, in long tons:

	1906.	1907.	Changes.
Straits	10,054	10,004	D. 50
Australia	742	508	D. 234
Great Britain	17,471	16,587	D. 884
Holland	347	783	I. 436
Other Europe	963	750	D. 213
Other countries	238	62	D. 176
Total	29,815	28,694	D. 1,121

The decrease in the total imports this year was 3.8 per cent.

Lead—Imports of lead into the United States in all forms, with re-exports of imported metal, are reported as below for the eight months ended Aug. 31, in short tons of 2000 lb. each:

	1906.	1907.	Changes.
Lead, metallic	10,306	7,312	D. 2,994
Lead in ores and base bullion	51,101	41,977	D. 9,124
Total imports	61,407	49,289	D. 12,118
Re-exports	32,595	30,053	D. 2,542
Net imports	28,812	19,236	D. 9,576

Of the imports this year 37,000 tons were from Mexico and 4768 tons from Canada. Exports of domestic lead were 63 tons in 1906, and 30 tons in 1907; a decrease of 33 tons.

Spelter—Exports of spelter, zinc dross and zinc ores from the United States for the eight months ending Aug. 31 are reported as below, zinc ore being in long tons, the others in short tons:

	1906.	1907.	Changes.
Spelter	3,283	391	D. 2,892
Zinc dross	9,286	7,903	D. 1,383
Zinc ores	20,535	12,141	D. 8,394

Imports of spelter for the eight months were 2114 tons in 1906, and 974 tons in 1907; a decrease of 1140 tons. Imports of zinc ores in July and August were 21,069 tons of calamine and 1360 tons other ores; 22,429 tons in all. Previous to July the imports of ores were not reported.

Antimony—Imports of antimony into the United States for the eight months ended Aug. 31, were as follows, in pounds:

	1906.	1907.	Changes.
Metal and regulus	4,793,604	5,598,118	I. 804,514
Antimony ore	1,168,952	2,253,851	I. 1,084,899

There was a large increase in metal and regulus; while the imports of ore were nearly double those of last year

Nickel—Imports of nickel ore and matte into the United States for the eight months ended Aug. 31 were 10,174 tons in 1906, and 11,049 tons, containing 12,689,671 lb. metal, in 1907. The metal contents were not reported last year.

Exports of nickel, nickel oxide and nickel matte for the eight months were 7,888,450 lb. in 1906, and 6,584,699 lb. in 1907; a decrease of 1,303,751 lb. this year.

Quicksilver—Exports of quicksilver from the United States for the eight months ended Aug. 31 were 315,603 lb. in 1906, and 322,520 lb. in 1907; an increase of 6917 lb. this year.

Platinum—Imports of platinum into the United States for the eight months ended Aug. 31 were 7633 lb. in 1906, and 4275 lb. in 1097; a decrease of 3358 lb. this year.

Aluminum—Exports of aluminum in all forms from the United Sttaes for the eight months ended Aug. 31 were valued at $172,813 in 1906, and $237,556 in 1907; an increase of $64,743 this year.

Missouri Ore Market

Joplin, Mo., Oct. 12—The highest price paid for zinc was $45.50, the assay base price ranging from $40 to $42.50 per ton of 60 per cent. zinc. Ore was, however, sold on a straight bid equivalent to a base of $43, and one sale is said to have been made today, for next week delivery, at a price equal to a $43.50 base. The average price for the week, all grades, was $40.70. The highest known price paid for lead ore was $55, with a rumored sale at $56. Medium grades sold from $52 to $54 per ton, and the average, all grades, was $52.18 per ton.

The shipments were the largest for eight weeks, all smelting companies securing an increased tonnage. The action of the American Zinc, Lead and Smelting Company in making a quick purchase of 1200 tons, is credited with having caused the upward movement in prices.

Following are the shipments of zinc and lead from the various camps of the district for the week ending Oct. 12:

	Zinc, lb.	Lead, lb.	Value.
Webb City-Carterville	3,238,470	741,560	$87,287
Joplin	2,522,000	338,320	63,164
Galena	1,430,700	182,130	33,349
Oronogo	1,009,690	.....	20,339
Alba-Neck City	889,860	4,720	19,694
Duenweg	372,100	163,810	12,073
Spurgeon	296,510	155,230	9,276
Badger	368,780	.....	8,113
Aurora	454,710	7,470	7,727
Granby	510,000	20,000	6,550
Prosperity	305,590	.....	6,417
Cave Springs	105 800	.....	2,116
Zincite	70 220	.....	1,485
Carthage	62 590	.....	1,376
Sarcoxie	60,650	.....	1,273
Miami, Okla	58,840	.....	1,236
Stott City	42,730	.....	855
Totals	11,799,240	1,613,240	$282,330
41 weeks	470,881,510	71,298,750	$13,328,342

Zinc value, the week, $240,224; 41 weeks, $10,711,481
Lead value, the week, 42,106; 41 weeks, $2,616,861

Average prices for ore in the district, by months, are shown in the following table:

ZINC ORE AT JOPLIN.			LEAD ORE AT JOPLIN.		
Month.	1906.	1907.	Month.	1906.	1907.
January	47.38	45.84	January	75.20	83.53
February	47.37	47.11	February	72.83	84.58
March	42.68	48.66	March	73.73	82.75
April	44.63	48.24	April	75.13	79.76
May	40.51	45.98	May	78.40	79.56
June	43.83	44.82	June	80.96	73.66
July	43.25	45.79	July	74.31	58.18
August	43.56	43.22	August	75.36	59.54
September	42.58	40.11	September	79.64	53.52
October	41.55	.....	October	79.84	.....
November	44.13	.....	November	81.98	.....
December	43.68	.....	December	81.89	.....
Year	43.24	.....	Year	77.40	.....

Wisconsin Ore Market

Platteville, Wis., Oct. 12—The price of zinc ore shows no change during the week, 60 per cent. ore still bringing $40 per ton, in spite of the advance in spelter. Buyers are more active than for weeks past and increased shipments are expected. The tonnage for the week was 1,924,500 lb. zinc ore, a gain of 267,780 lb. over the previous week. Two cars of lead are recorded this week, against none last week. The Picher Lead Company, of Joplin, entered the field, paying Joplin prices, $26.50 per 1000 lb., f.o.b. Joplin, Mo., for lead ore.

Ore shipments for week ending Oct. 12 were:

	Zinc ore, lb.	Lead ore, lb.
Mineral Point	60,000	.....
Harker	64.790	.....
Linden	60,000	.....
Highland	104,000	.....
Galena	88,800	64,800
Hazel Green	548,700	.....
Benton	436,520	30,000
Cuba City	176,000	.....
Elmo	152,630	.....
Platteville	153,060	.....
Livingston	80,000	.....
Total	1,924,500	94,800

Zinc-ore shipments from Hazel Green for the week ending Oct. 5 were 220,100 lb.; they were not included last week.

Chemicals

New York, Oct. 16—Little of note transpired during the week just past, and the general market has been quiet. Shipments have been satisfactory, although not very heavy. Buying has been largely for immediate requirements. Arsenic salts have been dull and heavy, but those of antimony showed more life.

Copper Sulphate—The recent reduction in price brought forth some buying movement, but consumers are still cautious about contracting for large quantities, expecting a still further drop in price in accordance with the reduced price in the metal. There was no change in price last week, carload lots selling for $6 per 100 lb. and smaller parcels for $6.25 and up, according to quantity.

Nitrate of Soda—The market is quiet and not much business is being done. Supplies are good and distributers are well stocked at present. It was reported that one seller was offering 95 per cent. nitrate at 2.05c. and 96 per cent. at 2.40c. with no takers. We are informed, upon reliable authority, that there is no truth in this report. Quotations are as follows: For spot delivery, 95 per cent., 2.40@2.45c.; 1908 delivery, 2.45@2.47½c.; 1909 delivery, 2.40c. The 96 per cent. grade sells 5c. per 100 lb. higher for all deliveries.

Sulphur—The market has been in an unsettled condition and buying has been confined to spot parcels. Consumers are loath to place large orders ahead under the prevailing conditions. Quotations are $19.50 @20 per ton according to point of delivery.

Mining Stocks

New York, Oct. 16—The general tone of the stock markets has been nervous and depressed. Stocks were cut down on all sorts of rumors, or on none at all, and in several cases low records were made. Amalgamated Copper sold down to $52½; American Smelting and Refining common to $76¼; Tennessee Copper to $24. United States Steel touched $22½ for the common and $82 for the preferred.

A sale of Homestake, of South Dakota, was reported early in the week, 100 shares changing hands at $70.50. On Oct. 14 there was another sale of 100 shares at $72½ per share.

The curb sensation of the week was a sudden rise in United Copper on Oct. 14. The stock was run up from $39 to $60 in an hour, but later lost part of the gain, closing at $53 on the same day. Sales of 18,200 shares were recorded. The rise was, apparently, due to manipulation. On Oct. 16 this stock sold down to $18. The excitement had little effect on the other coppers. The Tonopah and Goldfield stocks were rather dull. Cobalt stocks were more active, but weak, Nipissing selling down to $6; Foster Cobalt to 62c. and Cobalt Central to 29½c. per share.

The persistent decline in the Nevada stocks, which are largely held in Philadelphia, has caused much concern in that city. A recent estimate of the difference between the highest points reached this year and present prices, on 70 quoted stocks, gives a total loss of $222,849,000 in nominal value. Some extreme declines have been: Tonopah Mining, $22 to $10; Tonopah Extension, $15 to $1; Tonopah Belmont, $7.25 to $2; Goldfield Consolidated, $11 to $6; Combination Fraction, $8 to $1.25; Goldfield Daisy, $6 to $0.90; Tramp Consolidated, $3.50 to $0.20; Furnace Creek, $4.50 to $0.20. The fall extends to all stocks.

Boston

Oct. 15—As yet there seems to be no bottom to the market for mining shares. Liquidation was renewed the past week and previous low records do not stand. The only favorable factor is that brokerage houses are carrying only about 10 per cent. of their usual amount of stocks and the liabilities of some of the leading houses are the smallest for 10 years. Calls for margins have been well responded to, while some have sold their holdings and taken their losses. Figures prepared show a depreciation in 46 copper stocks of close to $550,000,000 from the high point reached last January.

As in the past, the Cole-Ryan stocks have been the worst losers, the depreciation

in these five alone aggregating some $160,000,000 from the high. Calumet & Arizona broke $14, to $92, during the week under continued free offering, recovering to $95 today. North Butte is the lowest of the movement at $38.75, which compares with $47 a week ago. Butte Coalition has lost $5 to $10.

The price of $52 reached by Amalgamated discounts a cut in the dividend rate. Today 1⅛ per cent. was bid for the next dividend.

Important transfers of United States Smelting and Refining stock are reported. The holders of 40,000 shares unable to finance it were relieved by other interests, and report says at $37 per share. This included both common and preferred shares.

STOCK QUOTATIONS

NEW YORK	Oct. 15
Name of Comp.	Clg
Alaska Mine	....
Am.Nev.M.&P.Co.	....
Amalgamated	53¼
Anaconda	30⅜
Balakiala	4¼
British Col. Cop.	5
Buffalo Cobalt	....
Butte & London	⅞
Butte Coalition	10¼
Butte Cop. & Zinc	....
Cobalt Contact	....
Colonial Silver	1¼
Cum. Ely Mining	5
Davis Daly	5⅛
Dominion Cop	2
El Rayo	....
Foster Cobalt	.62
Furnace Creek	1/16
Giroux Mine	4
Gold Hill	1
Granby, New	....
Greene Gold	¾
Greene G. & S	¾
Greenw'r & D.Val.	.75
Guanajuato	2⅞
Guggen. Exp.	170
Hanapah	.35
McKinley Dar	¾
Micmac	3⅛
Mines Co. of Am	1⅜
Mitchell Mining	1⅛
Mont.Sho. C.(New)	....
Nev. Utah M. & S.	2¾
Newhouse M. & S.	6¼
Nipissing Mines	5⅞
Old Hundred	2⅛
Silver Queen	⅞
Stewart	1
Tennessee Cop'r	24¼
Union Copper	⅞
Utah Apex	5⅜
West Columbus	.11

N. Y. INDUSTRIAL	
Am. Agri. Chem	14½
Am. Smelt. & Ref.	76⅝
Am. Sm. & Ref., pf.	92
Bethlehem Steel	....
Colo. Fuel & Iron	16
Federal M. & S., pf.	....
Inter. Salt	14⅞
National Lead	42½
National Lead, pf.	90
Pittsburg Coal	....
Republic I. & S.	18
Republic I. & S., pf.	65¾
Sloss-Sheffield	37¼
Standard Oil	425
Tenn. C. & I.	135
U. S. Red. & Ref.	9½
U. S. Steel	23⅛
U. S. Steel, pf.	82⅞
Va. Car. Chem.	16
Va. I. Coal & Coke	....

ST. LOUIS	Oct. 12	
N. of Com.	High.	Low.
Adams	.40	.25
Am. Nettie	.04	.03
Center Cr'k	2.25	2.00
Cent. C. & C.	68.00	67.00
C.C. & C. pd.	79.00	78.00
Cent. Oil	110.00	100.00
Columbia	3.00	2.00
Con. Coal	27.00	25.00
Doe Run	140.00	130.00
Gra. Bimet.	.35	.30
St. Joe	15.00	14.00

BOSTON	Oct. 15
Name of Comp.	Clg.
Adventure	....
Allouez	27
Am. Zinc	23½
Arcadian	3½
Atlantic	7
Bingham	5
Boston Con.	12
Calumet & Ariz.	94
Calumet & Hecla	602
Centennial	18¾
Con. Mercur	.35
Copper Range	48½
Daly-West	10
Franklin	7
Greene—Can	6⅞
Isle Royal	13
La Salle	9¼
Mass.	3
Michigan	7¾
Mohawk	41
Mont.C.&C.(new)	....
Nevada	8
North Butte	38¾
Old Colony	50
Old Dominion	19¾
Osceola	84
Parrot	10
Phoenix	....
Quincy	73½
Rhode Island	....
Santa Fe	2
Shannon	7¾
Tamarack	60
Trinity	12
United Cop., com.	50
U. S. Oil	9
U. S. Smg. & Ref *	35
U.S.Sm.& Re.,pd *	35⅝
Utah Copper*	30¾
Victoria	3⅞
Washington	....
Winona	3
Wolverine	97
Wyandotte	....

*Ex. Div. †Ex. Rights.

BOSTON CURB	
Ahmeek	....
Ariz. Com	....
Black Mt.	....
East Butte	5¼
Hancock Con.	....
Keweenaw	4¾
Majestic	⅞
Raven	.84
Shawmut	.23
Superior	9⅝
Superior & Pitts.	8
Troy Man	.72

LONDON	Oct. 9		
Name of Com.	Clg.		
	£1	3s	9d
Dolores	0	2	3
Stratton'sInd.	0	18	3
Camp Bird	2	0	7½
Esperanza	1	7	6
Tomboy	1	4	4
El Oro	0	15	3
Oroville			
Somera			
Utah Apex	0	12	6
Ariz.Cop.,pfd.	2	9	2
Ariz.Cop.,def.			

Cabled through Hayden, Stone & Co., N. Y.

NEVADA STOCKS. Oct. 16.

Furnished by Weir Bros. & Co., New York.

Name of Comp.	Clg.	Name of Comp.	Clg.
TONOPAH STOCKS		Golden Sceptre	.05
Belmont	1 37½	Homestake King	.65
Extension	1.37½	Montgomery Mt.	.06
Golden Anchor	.08	Mont. Shoshone C.	4 75
Jim Butler	.51	Original Bullfrog	.03
MacNamara	.22	Tramp Cons	.18½
Midway	.70	MANHAT'N STOCKS	
Montana	1.90	Manhattan Cons.	.30
North Star	.09	Manhat'n Dexter	.06
Tonopah & Cal	.05	Jumping Jack	.10
Tono'h Mine of N.	8.62½	Stray Dog	.10
West End Con	.50	Indian Camp	.05
GOLDFI'D STOCKS		GREENW'R STOCKS	
Adams	.07	Furnace Creek	.25
Atlanta	.25	Greenwater & D.V.	.10
Blue Bell	.09	Green'rCop.M.& S.	.10
Blue Bull	.18	United Greenwa'r	.07
Booth	.20	MISCELLANEOUS	
Columbia Mt	.20	Golden Boulder	.20
Comb. Frac	.96	Hayseed	.45
Cracker Jack	.10	Lee Gold Grotto	.16
Dia'dfield B. B. C.	.15	Nevada Hills	4 12½
Goldfield Belmont	.18	Nevada Smelting	1 12½
Goldfield Con	5.06½	Pittsburgh S. Pk.	1 05
Goldfield Daisy	56	Round Mt. Sphinx	.29
Goldfield Mining	.90		
Great Bend	.28		
Jumbo Extension	1.00		
Jumbo Mining	2.50		
Katherine	.06		
Kendall	.14		
Laguna	.90		
Lone Star	.13		
Lou Dillon	.07		
May Queen	.07		
Mohawk	12.00		
Oro	.12		
Red Hill	.25		
Red Top	2.50		
Roanoke	.10½		
Sandstorm	.20		
Silver Pick	.25		
St. Ives	.44		
Triangle	.08		
BULLFROG STOCKS			
Amethyst	.13		
Bullfrog Daisy	.08		
Bullfrog Mining	.05		
Bullfrog Nat. B.	.09		
Gibraltar	.10		
Gold Bar	.35		

COLO. SPRINGS Oct. 12

Name of Comp.	Clg.	Name of Comp.	Clg.
Acacia	....	Dante	5½
Black Bell	....	Doctor Jack Pot	6¼
C. C. Con	4¼	Elkton	50½
		El Paso	35
		Findlay	38
		Gold Dollar	6½
		Gold Sovereign	3¼
		Isabella	23
		Index	....
		Jennie Sample	....
		Jerry Johnson	....
		Mary McKinney	42
		Pharmacist	....
		Portland	110
		Un. Gold Mines	5
		Vindicator	81
		Work	17

New Dividends

Company.	Payable.	Rate.	Amt.
Am. Agri. Chem., pfd	Oct. 15	$3 00	$544,590
Anaconda	Oct. 16	1.25	1,500,000
Batopilas	Dec. 31	0 12½	56,250
Bunker Hill & Sullivan	Oct. 4	0.60	120,000
Central C. & C., com	Oct. 15	1.50	76,875
Central C. & C., pfd	Oct. 15	1.25	23,438
Columbus Con	Oct. 15	0 20	56,768
Cons. Mines Co., Nev	Oct. 25	0 10	360,000
Consolidated Coal	Oct. 31	1.50	75,000
Doe Run	Oct. 15	0.50	29,531
Goldfield Con	Oct. 15	0.10	500,000
Inter. Nickel, pfd	Nov. 1	1.50	131,123
Nipissing	Oct. 21	0.15	180,000
Pennsylvania Salt	Oct. 15	3.50	210,000
Philadelphia Gas, com	Nov. 1	0.75	454,296
Pioneer, Alaska	Oct. 10	3.00	150,000
Silver King Coalition	Oct. 15	0.15	187,500
Tonopah of Nev	Oct. 21	0 25	250,000
United Metals Selling	Nov.	7.50	375,000
United Zinc	Oct. 15	0.50	9,978
U. S. Smg., Ref. & Mg., com.	Nov. 1	0 87½	304,646
U. S. Smg., Ref. & Mg., pfd.	Nov. 1	0 87½	656,250
Utah Con	Oct. 15	1.00	300,000
Va. Car. Chem., pfd	Oct. 15	2.00	360,000
Vindicator	Oct. 25	0.03	60,000
Wolverine	Oct. 14	7.50	450,000

Assessments

Company.	Delinq.	Sale.	Amt.
Alturas, Ida	Nov. 8	Nov. 29	$0.02
Challenge Con., Nev.	Oct. 9	Oct. 30	0.10
Diamond Creek, Cal.	Oct. 20	Nov. 26	0.02
Dollarhide, Ida	Nov. 8	Nov. 29	0.02
Emerald, Utah	Dec. 14	Jan. 11	0.01½
Helios, Cal	Sept. 17	Oct. 15	0.02
Herkimer Gravel, C.	Oct. 7	Dec. 28	0.03
Imlay, Nev.	Sept. 26	Oct. 16	0.01
Jenny Lind, Cal	Sept. 30	Oct. 15	0.05
Lucky Dutchman, N.	Oct. 5	Oct. 28	0.01
McMillen, Cal.	Sept. 23	Oct. 28	0.03
Nevada-Fairview	Sept. 23	Oct. 28	0.02
Occidental Con., N.	Oct. 3	Oct. 28	0.10
Oro Cobre, Cal	Sept. 24	Oct. 14	0.02½
Peruvian Con., Utah	Oct. 1	Oct. 16	0.01½
Posey Canyon, Cal.	Oct. 5	Oct. 26	0.01
Savage, Nev.	Sept. 26	Oct. 17	0.10
Sheba G. & S., Utah	July 30	Nov. 2	0.10
Yellow Jacket, Nev.	Sept. 23	Oct. 30	0.15
Zeibright, Cal.	Oct. 12	Oct. 29	0.05

Monthly Average Prices of Metals

AVERAGE PRICE OF SILVER

Month.	New York.		London.	
	1906.	1907.	1906.	1907.
January	65.288	68.673	30.113	31.769
February	66.108	68.835	30.464	31.852
March	64.597	67.519	29.854	31.325
April	64.765	65.462	29.984	30.253
May	66.976	65.981	30.968	30.471
June	65.394	67.090	30.185	30.893
July	65.105	68.144	30.113	31.366
August	65.949	68.745	30.529	31.637
September	67.927	67.792	31.483	31.313
October	69.523	.....	32.148	.....
November	70.813	.....	32.671	.....
December	69.050	.....	32.003	.....
Year	66.791	.....	30.868	.....

New York, cents per fine ounce; London, pence per standard ounce.

AVERAGE PRICES OF COPPER

	New York.				London.	
	Electrolytic		Lake.			
	1906.	1907.	1906.	1907.	1906.	1907.
January	18.310	24.404	18.419	24.825	78.869	106.739
February	17.869	24.869	18.116	25.236	78.147	107.356
March	18.361	25.065	18.641	25.560	81.111	106.594
April	18.375	24.224	18.688	25.260	84.793	98.625
May	18.475	24.048	18.724	25.072	84.867	102.375
June	18.442	22.665	18.719	24.140	83.994	97.272
July	18.190	21.130	18.585	21.923	81.167	95.016
August	18.380	18.356	18.706	19.255	83.864	79.679
September	19.033	15.565	19.328	16.047	87.831	68.375
October	21.203	.....	21.722	.....	97.269	.....
November	21.833	.....	22.398	.....	100.270	.....
December	22.885	.....	23.350	.....	105.226	.....
Year	19.278	.....	19.616	.....	87.282	.....

New York, cents per pound. Electrolytic is for cakes, ingots or wirebars. London, pounds sterling, per long ton, standard copper.

AVERAGE PRICE OF TIN AT NEW YORK

Month.	1906.	1907.	Month.	1906.	1907.
January	36.390	41.548	July	37.275	41.091
February	36.403	42.102	August	40.606	37.667
March	36.662	41.313	September	40.516	36.689
April	38.900	40.938	October	42.852	.....
May	43.313	43.149	November	42.906	.....
June	39.260	42.120	December	42.750	.....
			Av. year	39.819	.....

Prices are in cents per pound.

AVERAGE PRICE OF LEAD

Month.	New York.		London.	
	1906.	1907.	1906.	1907.
January	5.600	6.000	16.850	19.828
February	5.464	6.000	16.031	19.531
March	5.350	6.000	15.922	19.703
April	5.404	6.000	15.959	19.975
May	5.685	6.000	16.725	19.688
June	5.750	5.760	16.813	20.188
July	5.750	5.288	16.525	20.350
August	5.750	5.250	17.109	19.063
September	5.750	4.813	18.266	19.775
October	5.750	.....	19.350	.....
November	5.750	.....	19.281	.....
December	5.900	.....	19.609	.....
Year	5.657	.....	17.370	.....

New York, cents per pound. London, pounds sterling per long ton.

AVERAGE PRICE OF SPELTER

Month.	New York.		St. Louis.		London.	
	1906.	1907.	1906.	1907.	1906.	1907.
January	6.487	6.732	6.337	6.582	28.225	27.125
February	6.075	6.814	5.924	6.664	25.844	25.938
March	6.209	6.837	6.056	6.687	24.563	26.094
April	6.078	6.685	5.931	6.535	25.781	25.900
May	5.997	6.441	5.846	6.291	27.000	25.563
June	6.096	6.419	5.948	6.269	27.728	24.469
July	6.006	6.072	5.856	5.922	26.800	23.850
August	6.027	5.701	5.878	5.551	26.938	21.969
September	6.216	5.236	6.056	5.086	27.563	21.050
October	6.222	.....	6.070	.....	28.075	.....
November	6.375	.....	6.225	.....	27.781	.....
December	6.593	.....	6.443	.....	27.938	.....
Year	6.198	.....	6.048	.....	27.020	.....

New York and St .Louis, cents per pound. London in pounds sterling per long ton.